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Vol. 3 No. 1 October 1985 £1

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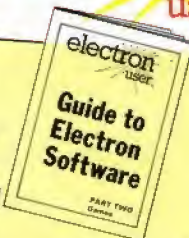
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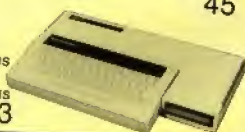
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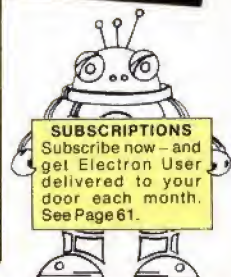
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electron user NEWS

Joysticks upgrade

A DEVICE that makes analogue joysticks perform like switched ones at the flick of a switch has been produced for the Electron by Voltmace.

The Voltmace ASC enables an analogue joystick to simulate a switched joystick by giving a full analogue to digital value for only a small deflection from the centre.

It also changes the sensitivity of an analogue joystick by a factor of two, so a full joystick movement will only give half the A/D voltage change.

It plugs into the analogue port and provides its own 15 way D socket for the joystick.

The switched mode is used for games software where the program writer has used A/D values wide apart. With the ASC in switched mode a slight movement of the joystick in any direction will give the effect of pushing the joystick right over.

The user switches the ASC box off to run programs where analogue values are needed.

Price: £9.95.

CHEAPIES!

THREE new games for Electron are now available from Blue Ribbon Software. Castle Assault, Diamond Mine and Nightmare Maze cost £2.50 each.

Acornsoft staff wait for Electron go-ahead

AFTER several months of enforced inactivity due to Acorn's financial difficulties there are high hopes that Acornsoft will soon start turning out new software for the Electron.

And this is expected to have a roll-on effect at other software houses, whose flagging confidence in the future of the Electron should be restored when they see Acornsoft supporting it with new programs.

Acornsoft has been in the doldrums most of 1985 as the parent company staggered

from one financial crisis to another.

The firm's cash flow problems spilled over into Acornsoft causing the suspension, and in some cases the scrapping, of Electron software under development.

Apart from Magic Mushrooms, the arcade style game which proved very popular with its sophisticated screen design facility, output dwindled to a standstill.

Adding to the problem was the uncertainty surrounding talk of selling off Acornsoft to

raise much needed capital.

But that danger has passed. The latest agreement with Olivetti means that Acornsoft will stay in the Acorn stable, employees have been told.

Now the programmers are eagerly waiting for the go-ahead on several projects that have been held up in the pipeline.

At one time Acornsoft was on the point of bringing out about six new games for the Electron, and had conversions of popular BBC Micro programs finished six months ago.

But, though Acorn has achieved financial stability through its recent arrangement with Olivetti, only about two or three of these programs are likely to be released – at least in the foreseeable future. And these will come out one at a time over a period.

However, *Electron User* understands from its Acornsoft sources that there are several home education programs in various stages of production.

This will gladden the hearts of those who have been supporting the *Electron User* campaign to get more education software on the shelves of computer

shops.

One title *Electron users* are unlikely to see, unfortunately, when Acornsoft begins to roll again is the BBC Micro's motor racing hit *Revs*.

"We would have loved to have produced a version for the Electron, but it just isn't possible", a spokesman claimed.

"But apart from this one program we shall be sticking to the promise we made in last month's *Electron User* to bring out all our new products for both the Electron and BBC Micro machines".

On the ball

A NEW package from Wigmore House gives the Electron enormous graphics potential. It is claimed.

The combination of Trackball and Mousepaint, its customised graphics software make computer aided design possible on the Electron.

Priced at £24.95, the Trackball enables instant directional change of the Electron's cursor. It uses the joystick or analogue port so that the existing software can generally still be used.

The Mousepaint package costs an additional £11.50.

Robin rides again

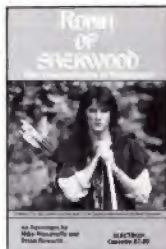
THE adventures of Robin Hood are now featured in *The Touchstones of Rhiannon*, latest

game from *Adventure International* for the Electron.

Based on the TV series *Robin of Sherwood*, it uses full sentence commands.

The player assumes and controls the character of Robin Hood. Maid Marion and friends assist Robin in his bid to retrieve the Touchstones of Rhiannon and return them to Rhiannon's Wheel.

Available on cassette price £7.95. Text only.



ONE of the leading figures behind the development of the Electron during the last five years, Dr Jon Thackray, will be guest celebrity at the Walk-In Forum during the Electron and BBC Micro User Show in Manchester.

The show at Umist, from September 27 to 29, is expected to break all previous attendance records, repeating the success of its London counterpart in May.

The Forum is a unique opportunity for Electron owners to question leading figures in the industry, including top boffins like Dr Thackray, whose work with computers began during the seven years he spent at Cambridge University earning his triple first in maths and a PhD.

As a research assistant he wrote the adventure game Acheton for the BBC Micro, and designed the compiler and interpreter system to run it.

He joined Acorn in 1982, working on the Electron operating system and also on UASM, the predecessor of the MASM assembler used for developing the BBC Micro. His latest project was the operating system for the BBC B+.

The distinguished Forum line-up also includes Paul Beverley, Norwich Computer Services, taking an in-depth look at Wordwise; Peter Brameld, Database Publications, examining electronic mail and its potential for domestic use; Rob MacMillan, Acornsoft, discussing the View family of products; Peter Davidson, Database Software, revealing how to create a bestselling

... taking the North by storm

software package; Andy Hood, Pace Micro Technology and author of Commstar, unravelling the mysteries of communications.

Such was the success of the London show earlier this year among both exhibitors and the public that the Manchester event was guaranteed to be a virtual sell-out several months ago.

Advance ticket sales for Umist are reported to have never been heavier.

WHEN the metropolitan boroughs disappear from the municipal map at the end of March so too will a project in which Electrons have been helping youngsters learn about computers.

Since 1981 South Yorkshire County Council has been operating a "computers on the move" mobile workshop scheme through its Urban Action Programme.

Thousands of unemployed teenagers — and schoolchildren apprehensive about the advent of the classroom computer — have been given hands-on experience of micro technology.

The project has opened the door to new skills and interests for the jobless and given



The mobile workshop: "We see this as a job well done"

Breaking down barrier of hi-tech fear

younger children a boost up the academic ladder.

Run by Norman Warhurst, a systems analyst with the County Council, and his assistant, Sheffield Polytechnic student Keith Renfry, the unit visits youth centres, probation centres, YTS groups and libraries each weekday for nine weeks during the summer months.

A wide range of computer hardware and software is available free to users, including seven Electrons.

Warhurst, who has been involved with the unit since its inception, told *Electron User*: "We are aiming to break

down the barriers of 'techno fear'.

"The majority of the youngsters I come into contact with have never used a computer, yet have the 'I'll never get the hang of it' attitude. At the end of each day, however, the majority leave the unit having learnt something about computing.

"The demand for the unit at Barnsley, Rotherham, Sheffield and Doncaster is enormous. Each user can get a five hour maximum taster course.

"We don't expect to turn out experts in a day. If the youngsters are a little more familiar with

computers and computing after having attended the workshop then we see this as a job well done".

Although the scheme will die with the County Council next year, Warhurst and others involved hope it will be resurrected and copied by other municipalities across the country.

"It has performed a very useful function in its lifetime and similar projects elsewhere could continue to spread the word that learning about computers can be a painless, enjoyable experience", said a South Yorkshire spokesman.

ROBOTS GO MICRO

SOFTWARE house Mar-
tech has introduced two
new games for the
Electron, both sched-
uled for release this
month.

The Battle Begins is
the first in a series of
computer games based
on the range of Zoid
robot toys.

Developed in con-
junction with toy manu-
facturers Tomy and
comic publishers
Marvel, it centres on a
battle for supremacy
between two warring
factions of the
dinosaur-like Zoids.
Price is £7.95.

TV personality and
strong man Geoff Capes
has helped Martech
develop a new game
based on his exploits.

It involves bringing
Geoff to the peak of
physical fitness for each
of several demanding
events.

Geoff Capes Strong-
man costs £7.95.

Alien action

TWO new cassette
games for the Electron
are now available from
Bevan Technology.

One Last Game
features horizontal
action and aliens which
alter their behaviour
patterns as the game
progresses.

Keyboards or
joysticks can be used
with Aabaton, where
six different aliens chal-
lenge the player who
must fight through 20
screens.

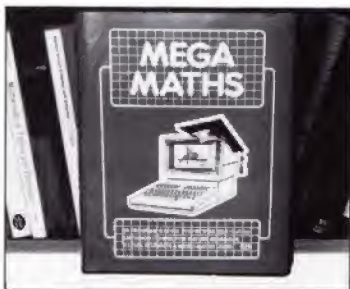
Price of each is
£7.95.

Price goes up

RIISING costs of
materials and labour are
blamed by Addictive
Games for the increase
in price of its best-sell-
ing program Football
Manager from £7.95 to
£8.95.



Maths is getting to be popular



MEGA Maths is the
latest title to top the
class in LCL's range of
educational software for
the Electron.

Designed with A level
students in mind or as a
refresher course for
mature students, it com-
plements their previous
Micro Maths for O level
students and Animated
Arithmetic for children
aged 3 to 8.

Intended as a step-
by-step self tuition and
revision maths course,
the 24 programs cover
105 topics common to

pure and applied maths.

It was written by a
professional graduate
programmer in consul-
tation with a highly
qualified specialist
advisory panel.

A user manual and a
book of model questions
and answers for GCE A
level examinations in
pure and applied maths
are included. These are
taken from university
papers and compiled by
a specialist in maths and
statistics.

Available on disc or
tape, it costs £24.

Only two - but look how we've GROWN!

*IT seems unbelievable, but with
this issue Electron User celebrates
its second birthday. We've had
two great years already, and the
third year looks like being even
more exciting.*

*Despite all the stories in the papers
of doom and gloom at Acorn, and the
substantial drop in price of the
Electron itself, interest in the machine
is booming as never before.*

*In the past six months Electron
User's own sales have increased by a
massive 46 per cent to more than
26,000 copies a month.*

*Our mailbox is expanding out of all
proportion and the programs being
sent us are getting better and better.*

*Electron users are growing in
numbers and knowledge and Electron
User is growing with them.*

*While Acorn may have dropped out
of the hardware field - temporarily we
hope - the list of add-ons is increasing.
Cumana, Advanced Computer Pro-
ducts (ACP) and Solidisk all have disc
systems available for the Electron.*

*Also joining the boom for more
advanced Electron hardware, Slogger
and ACP have both brought out
adaptors allowing the Electron to use
ROMs - the ultra-fast software on a
chip.*

*On the program front, although
games are still in demand, more and
more the emphasis is on serious
educational software is enormous and
here at Electron User we're proud of
having played a leading part in making
software houses aware of it.*

*And finally, firmware. Acornsoft are
at last making use of the Plus 1's ROM
slots with the superb View, Logo and
Pascal cartridges. With Vine Micro's
Addcomms toolkit, Slogger's Starmon
and Elkman, and ACP's Advanced Disc
Toolkit, ROM software for the Elec-
tron has come of age.*

*The first two years have been
fun. And with the many exciting
plans we have up our sleeves, the
third looks like being even better!*

SOLIDISK EFS COMBINES DISC AND A SOCKET FOR THE WIN

Solidisk Double Density DFS is now the ultimate in reliability and supported by the largest amount of software available for the Electron.

Solidisk relies on a good product and a large support network to win the heart of the user.

With over 75 Local Experts, covering England, Scotland and Wales, Solidisk can offer many users regional free fitting and advice.

With an ever increasing catalogue of free software, even users who are new to the Disc system can expect to build up a large library in a fairly short time.

Solidisk Software Support Service already has responsibility for over 50,000 BBC computer users and the ability to give you the best service matched only by the largest companies.

Solidisk Double Density DFS handles both BBC Discs and Electron Discs, in single and double density whereas the Acorn's PLUS 3 can only handle ADFS discs.

Solidisk ADFS has nice features such as automatic disc format sensing, built-in disc formatter and verifier and programmable disc speed.

It also has more than 20 disc utilities built into the ROM.

Standard features for both BBC DFS and ELECTRON ADFS implementations include:

1) Automatic Write Error Correction.

2) Automatic 40/80 track stepping, the ADFS 2.1 will let you read and write 40 track discs if you have an 80 track drive.

3) Disc repair facilities.

Disc sector editor (*DZAP), memory editor (*MZAP), recover good sectors (*RECOVER) rewrite multiple sectors (*RESTORE), read bad sectors and bad track (*RTRACK), repair and restore bad sectors and track (*WTRACK) and the powerful disc copy (*DCOPY) which is capable of duplicating even some non BBC discs.

4) Tape to disc facilities.

Direct transfer from tapes to disc (*TAPEDISC) will work with all unprotected programs. *TAPELOAD and *TAPESAVE will cope with more difficult ones. Only in some cases (multi-part games cassettes) will you need Solidisk tape copier.

5) Wordprocessing facilities.

This facility allows *BOOT and other text files to be edited, saved and printed in any screen mode.

6) Automatic disc format sensing.

On Shift-Break, the STL ADFS 2.1 will detect the disc format and use the right BBC DFS or Electron ADFS to run.

On the Electron ADFS side, the 2.1 ROM also has some very nice features:

1) Extensive Disc formatting facilities.

*FORM40, *FORM80, *FORM160 and *WFORM (for the Winchester) are available to handle any disc drive.

2) Disc verifying facilities.

*VERIFY will check all disc sizes including Winchester for media defects.

3) Number of opened channels.

This is the star feature of Solidisk ADFS.

This facility (*OPEN) allows you to specify how many files will be opened in a program, thus maximising the available RAM while avoiding buffer page swapping as on the Acorn ADFS.

It leaves PAGE at &1900 for most programs, gives more room to View and Viewsheets and avoids unnecessary conversion work for many programs originated for the BBC DFS to be run on your Electron.

On the BBC DFS side, the STL ADFS 2.1 handles both single and double density and in addition, it supports:

1) Unlimited catalogue entries.

2) Unlimited filesize.

THE SOLIDISK 16k SIDEWAYS RAM:

Solidisk Sideways RAM is an almost indispensable add-on for the Electron with disc drives.

The Sideways RAM occupies the same memory area as the BASIC or ADFS ROM in the micro's memory map. This means that Sideways RAM can run almost any ROM type software,

including languages, utilities and games.

Sideways RAM is notably invaluable to run games and specially "MEGAGAMES".

Games and programs run at 2MHz clock speed in Sideways RAM, if loaded into the Electron RAM, they can only run at 1MHz clock speed, ie half the speed of Sideways based games.

Megagames are too large to be run on the unexpanded Electron.

They use extensively 8 colour high resolution screen (mode 2), background music, sound and

high speed sprites.

Solidisk supply free software to maximise the use of Sideways RAM on the Electron. These include Wordprocessor, Spreadsheet, Database, Toolkit, Machine Code Monitor, Printer Buffer, Sprites, Playtunes, Virtual Memory Processor, VDU Replay, Screen Effects, digitised pictures etc...

THE WINCHESTER SOCKET:

Solidisk has the most powerful Winchester system for the BBC computers and the Electron. The Winchester system can provide from 20 Megabytes to a theoretically possible 1300 Gigabytes of storage, directly on line with the Electron.

The same Winchester unit can be used on the BBC B, the BBC PLUS and the Electron without any change.

You can read more about it in BBC Micro User or in Acorn User Magazines. Price of a 20 Megabytes system is only £700.00 + VAT (£805.00).



SOLIDISK TECHNOLOGY LIMITED, 17 SWEYNE AVE, SOUTHEM-ON-SEA, ESSEX SS2 6JQ. TEL. SOUTHEM (0702) 354674 (10 lines).



FX IN ACTION

THIS month we're going to take a look at the *FX calls that change the action of the keyboard.

We'll see how the Caps Lock can be switched on and off and how utility routines can be placed in the function keys and then used from within programs.

We'll start by looking at the bell — that's the standard beep or ting produced by most computers and many printers.

First press Return and then Copy. That noise is the bell. Try holding down Ctrl and pressing G. That too is the bell.

It can also be generated by entering:

```
PRINT CHR$(7)
```

or:

```
VOUT
```

The sound produced is controlled by four values which are placed in RAM when the micro is switched on.

The four *FX calls that can change those parameters — channel, amplitude, pitch and duration — are *FX211, *FX212, *FX213 and *FX214 respectively.

Let's try some out. To test the change in the sound it's easiest to use Ctrl+G as the Copy key doesn't make a noise if the cursor keys are being used.

Try *FX211.0 and Ctrl+G. This call has set the channel number of the sound produced to zero. Instead of a pure tone the sound generator produces noise.

*FX212 changes either the amplitude of the sound or sets an envelope number. If an envelope is to be used the number entered is (envelope number - 1)*8. If the amplitude is to be set then the default value of 144 should be used.

Try entering this envelope and then the two calls:

```
ENVELOPE2,1,4,-4,4,1,
2,1,126,0,0,-126,126,126
*FX212,8
*FX213,200
```

As you'll hear, the *FX213

*** Ringing the changes on your micro's bell**

*** Taking command of the Caps Lock status**

*** Keeping tabs on which key is pressed**

*FX211	*FX212	*FX213	*FX214	function
3	144	101	6	default settings
0	144	5	30	harsh sound
0	8	200	6	uses Envelope number 2
3	248	0	0	silent

Table 1: Sounding the bell

call sets the pitch of the note.

Finally we can use *FX214 to set the duration of the bell.

As with the last one the number used is exactly the same as in the SOUND statement. It should be noted that pressing the Break key resets the bell to its default setting.

Table 1 describes that default setting and three alternatives that I've tried. If you could come up with a better one send it to our Scrapbook page.

Let's leave the bell now and have a look at the keyboard characters. I use the Mini Office word processor to do all of my writing and I'm pleased that when it starts the Caps Lock is switched off.

In the classroom my pupils frequently make the mistake of

entering responses in upper case when only lower case is correct.

The *FX202 call gives programmers control over the Caps Lock status. *FX202.0 sets it on and *FX202.16 switches it off.

One improvement we could make to this is to warn the user, with a message on the screen, that the Caps Lock is on or off.

Before we can do that we've got to learn a bit more programming.

In all the *FX calls so far we've only been able to change values held in the micro's memory. This is called writing.

We haven't been able to read any of the values already sitting in the micro's memory, such as the default values at

power up. Program 1 contains a procedure that is used to read the results of making a *FX call.

The procedure PROCfx() expects three arguments — numbers inside the brackets that follow it. These correspond to the three numbers that can follow a *FX call and are placed in the resident integer variables A%, X% and Y% respectively.

The function USR then makes the *FX call and the result is a large number stored in response%. It's important that the variable response% is made local if there's a risk that it's used elsewhere in your program.

Lines 90 to 120 tease out the information from response%. The print statements aren't all necessary for

the working of the procedure, but they do give us vital data about what is going on.

Once you've got a copy of the procedure in your Electron it can be tested by making those calls you've come across already. Try switching the Caps Lock on and off by using `PROCfx(202,0,0)` and `PROCfx(202,16,0)`.

Now comes a bit of Boolean logic which enables us to interpret the numbers the procedure churns out.

Like all osbyte calls `*FX202,X,Y` affects a single byte in the memory of the computer. If that byte is 0 the Caps Lock is on, 16 and it's off.

The way the value of the byte is changed following the issue of a `*FX` command complies to this rule – the new value equals the old value when it is ANDed with Y and then EORed with X.

This is written conventionally as:

`<NEW VALUE> = (<OLD VALUE> AND Y) EOR X`

If you don't understand the

```
10 REM PROGRAM I
20 PROCfx(202,0,0)
30 END
40 DEFPROCfx(aax,xxI,yyI,yyI)
50 osbyteI=IFF4
60 aI=aaI:XI=xxI:YI=yyI
70 PRINTTAB(4)*"FX";aI,"
";XI,";YI
80 responseI=USR(osbyteI)
90 aI=responseIAND&FF
100 xI=(responseIAND&FF00)DIV&100
110 yI=(responseIAND&FF0000)DIV&10000
120 rI=(responseIAND&FF000000)DIV&1000000
130 PRINTTAB(4)*"a:"TAB(9)*"
x:"TAB(14)*"y:"TAB(19)*"r"
140 PRINTTAB(4);aI:TAB(9);
xI:TAB(14);yI:TAB(19);rI
150 PRINTTAB(4)*"k:"*aI:TAB
(9)*"k:"*xI:TAB(14)*"k:"*yI
160 ENDPROC
```

Program I

By JOHN WOOLLARD

logic don't worry – just take my word for it.

If the value of Y is zero then `<OLD VALUE> AND Y` equals zero as ANDing something with 0 always equals 0. So the new value of the byte is zero EOR X, whatever value you give X.

If X is 0 then this new value always equals X, as EORing something with 0 leaves its value unchanged. The byte is "cleared" to zero.

However if X lies between 1 and 255 the new value takes this value of X for the same reasons. The byte has a new value written to it.

So if X is 0 the byte takes the value of X after the `*FX` call. If you give X the value 0, then the new value of the byte will be 0.

If X is a non-zero number between 1 and 255 then the new value of the byte in memory affected by that particular `*FX` call will be X.

So far we've looked at the case where Y is 0 and X has been either 0 or a value between 1 and 255.

Now let's consider what happens using our rule when the value of Y is 255. Now `<OLD VALUE> AND Y` equals the old value, as ANDing with 255 leaves a value unaltered.

If X is 0, then, because any number EOR zero equals the original number, the result of all this ANDing and EORing is that the new value is exactly the same as the old one. In effect, no change is made to

the micro's memory.

These values are therefore used to read the byte in memory. You call the `*FX` with Y as 255 and X as 0 and know that the values returned by USR reflect the state of the memory before the call.

Alternatively, if Y is 255 and X is a non-zero value, then a binary toggle occurs – all the 1s become 0 and the 0s become 1. Table II summarises these results.

We can now put this information to some use, because reading values can be as important as writing them.

For instance, `*FX4` is only used to change the effects of the copy and cursor keys.

The call `*FX237` acts in a similar manner but it can also determine the status of those keys. Now we can use the procedure from Program I to explore it.

`PROCfx(237,0,0)`

sets the keys to their normal action. The byte is cleared.

`PROCfx(237,1,0)`

makes them produce ASCII codes. As X is 1 and Y is 0, so the byte is written to and becomes 1.

`PROCfx(237,2,0)`

enables the keys to be programmed in the same way as the function keys.

In the above cases the Y value was always 0. We wrote

→

OSBYTE CALLS

THE standard osbyte call looks like this:

`*FXA,I,Y`

where A, X and Y are three numbers that specify what that osbyte call will do by effecting the internal registers of the 6502 chip at the heart of the Electron.

One example of such an osbyte call is:

`*FX123,45,67`

This follows the `*FXA,X,Y` format of the above but it can be written in a variety of ways.

In this example the call number, A, is 123. This is the value placed in the accumulator in machine code programs.

45 is the X value (which goes into the X register) and 67 is the Y value (given to the Y register).

If the Y value is 0 then:

`*FX123,45,0`

may be written as:

`*FX123,45`

In other words, it need not be specified. Similarly, if the X and Y values are zero then the call would simply be `*FX123`.

In all `*FX` calls the commas can be replaced by one or several spaces and so the following are legal:

`*FX123 45 67`

`*FX123 45`

`*FX123 0 67`

`*FX123`

By the way, don't use `*FX123` unless you want your printer driver to go dormant!

X value	Y value	result	function
0	0	clear byte	used for writing
byte	0	set byte	used for writing
0	255	no change	used for reading
byte	255	toggle byte	used for writing

Table II: `*FXA, X, Y` – values and results

From Page 11

hex	dec	key
401	1	Control
410	16	0
411	17	3
412	18	4
413	19	5
415	21	6
417	23	-
419	25	Left Cursor
421	33	M
422	34	E
423	35	T
424	36	7
425	37	1
426	38	9
427	39	0
429	41	Down Cursor
430	48	1
431	49	2
432	50	0
433	51	R
434	52	6
435	53	U
436	54	0
437	55	P
439	57	Up Cursor
440	64	Caps Lock
441	65	A
442	66	X
443	67	F
444	68	Y
445	69	J
446	70	K
448	72	:
449	73	Return
451	81	S
452	82	C
453	83	6
454	84	H
455	85	M
456	86	L
457	87	I
459	89	Delete
461	97	Z
462	98	Space
463	99	V
464	100	B
465	101	N
466	102	.
467	103	,
468	104	/
469	105	Copy
470	112	Escape
479	121	Right Cursor

Table III: Internal Key Numbers

to the byte. Using a Y value of 255 and an X of 0 enables us to read the status. Try setting the keys using one of the calls above and then read the value using:

```
PROCfx(123,0,255)
```

The important response is contained in X.

If Y=255 and X contains a non-zero value then that value is toggled. That is, if the value was 0 it becomes 1, if it was 1 it becomes 0.

Try getting the keys to produce Ascii codes with:

```
PROCfx(237,1,0)
```

Check that it's really set by reading the value with:

```
PROCfx(237,0,255)
```

Repeated use of:

```
PROCfx(237,1,255)
```

will toggle the status off then on.

Here's another example. *FX229.1 is used to prevent the Escape key interrupting the action of a Basic program. It can be returned to its normal action with *FX229.0.

```
PROCfx(229,0,255)
```

can be used to read the status of the Escape key or:

```
PROCfx(229,1,255)
```

to toggle it on and off.

Now let's move to another use of osbyte, *FX121. It's possible to make a call scan the keyboard to see if any one of the 53 keys are being pressed.

Scanning starts from the lowest numbered key upward. Table III gives each of the key numbers both in decimal and hex.

The call can be made using:

```
PROCfx(121,0,0)
```

The value of X determines the precise action. If it's set to any number below 128 then the scan begins from that key.

The value of Y is not used or affected by this call, so it may be set to any value, but is normally zero.

*FX121 can also be used to determine if a particular key is being pressed. The value of X has to be the internal key

number EORed with 128 (&80).

If you can't work that out then ask the computer to do it. For example, the key number for Delete is 89 so type:

```
PRINT 89 EOR &80
```

and press Return. That gives the result 217. To test for Delete you'd use a line such as:

```
PROCfx(121,217,0):
IFx<0 THEN PRINT
"Delete pressed"
```

given by the x% variable. x% is equal to the number of the key pressed when a scan is made.

If a single key is being tested for, then x% equals zero if it's not pressed, x% is negative if it's pressed.

Program II shows how the call can be used to detect a key press. The program ends when the Escape key is pressed. (It has the internal key number 112.)

*FX229.1 and *FX229.0 are used to disable and re-enable the Escape key. *FX21 clears the keyboard buffer before the program ends.

Osbyte with A=122 (or, if you like, *FX122) acts in exactly the same way as the

previous call, but by default it begins scanning at key number 16. It cannot be used to test for the Ctrl key.

We'll now look at *FX138 and *FX153. Both calls are used to place characters into buffers.

I'll show how they can place data in the keyboard buffer for use after the program has stopped running. For this job the two calls are very similar but I'll use *FX138.

Using either the procedure from Program I or the *FX call directly we can insert the letter A into the buffer. Entering:

```
*FX138,0,65
```

or:

```
PROCfx(138,0,65)
```

makes the computer respond with an A. Try making other characters appear by changing the number 65.

This facility can be used to place the contents of the function keys in the buffer. Program III first defines keys and then uses *FX138 to carry out the commands.

This technique enables us

```
10 REM PROGRAM II
20 *FX229,1
30 REPEAT
40 PROCfx(121,0,0)
50 PRINTX
60 UNTILX=112
70 *FX21
80 *FX229,0
90 END
100 DEFPROCfx(a,z,x,z,y)
110 osbyteI=&FFF4
120 aI=a:zI=z:xI=x:yI=y
130 responseI=USR(osbyteI)
140 aI=responseIAND&FF
150 xI=(responseIAND&FF00)DIV&100
160 yI=(responseIAND&FF0000)DIV&10000
170 rI=(responseIAND&FF000000)DIV&1000000
180 ENDPROC
```

Program II

```
10 REM PROGRAM III
20 *KEY1RUN:M=other data
30 *KEY2MODE3:INVDU1,1,3
40 *KEY3MODE6:INVDU1,1,3
50 *KEY4LIST07:INVL:IM
60 *KEY5LIST00:INVL:IM
70 *KEY6CLCS:FORKI=&70706
80 *KEY7CLCS:FORKI=&70706
90 *KEY8CLCS:FORKI=&70706
100 *KEY9REN,100,10:IM
110 INPUT "Data "jdats$
120 IFdats$="LIST"THEN*FX
138,0,132
140 *KEY10LEN:IM
150 *KEY11LEN:IM
160 *KEY12LEN:IM
170 *KEY13LEN:IM
180 *KEY14LEN:IM
190 *KEY15LEN:IM
200 *KEY16LEN:IM
210 *KEY17LEN:IM
220 *KEY18LEN:IM
230 *KEY19LEN:IM
240 *KEY20LEN:IM
250 *KEY21LEN:IM
260 *KEY22LEN:IM
270 *KEY23LEN:IM
280 *KEY24LEN:IM
290 *KEY25LEN:IM
300 *KEY26LEN:IM
310 *KEY27LEN:IM
320 *KEY28LEN:IM
330 *KEY29LEN:IM
340 *KEY30LEN:IM
350 *KEY31LEN:IM
360 *KEY32LEN:IM
370 *KEY33LEN:IM
380 *KEY34LEN:IM
390 *KEY35LEN:IM
400 *KEY36LEN:IM
410 *KEY37LEN:IM
420 *KEY38LEN:IM
430 *KEY39LEN:IM
440 *KEY40LEN:IM
450 *KEY41LEN:IM
460 *KEY42LEN:IM
470 *KEY43LEN:IM
480 *KEY44LEN:IM
490 *KEY45LEN:IM
500 *KEY46LEN:IM
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660 *KEY62LEN:IM
670 *KEY63LEN:IM
680 *KEY64LEN:IM
690 *KEY65LEN:IM
700 *KEY66LEN:IM
710 *KEY67LEN:IM
720 *KEY68LEN:IM
730 *KEY69LEN:IM
740 *KEY70LEN:IM
750 *KEY71LEN:IM
760 *KEY72LEN:IM
770 *KEY73LEN:IM
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790 *KEY75LEN:IM
800 *KEY76LEN:IM
810 *KEY77LEN:IM
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830 *KEY79LEN:IM
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1110 *KEY107LEN:IM
1120 *KEY108LEN:IM
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1150 *KEY111LEN:IM
1160 *KEY112LEN:IM
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1180 *KEY114LEN:IM
1190 *KEY115LEN:IM
1200 *KEY116LEN:IM
1210 *KEY117LEN:IM
1220 *KEY118LEN:IM
1230 *KEY119LEN:IM
1240 *KEY120LEN:IM
1250 *KEY121LEN:IM
1260 *KEY122LEN:IM
1270 *KEY123LEN:IM
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4680 *KEY464LEN:IM
4690 *KEY465LEN:IM
4700 *KEY466LEN:IM
4710 *KEY467LEN:IM
4720 *KEY468LEN:IM
4730 *KEY469LEN:IM
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4990 *KEY495LEN:IM
5000 *KEY496LEN:IM
5010 *KEY497LEN:IM
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5040 *KEY500LEN:IM
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5070 *KEY503LEN:IM
5080 *KEY504LEN:IM
5090 *KEY505LEN:IM
5100 *KEY506LEN:IM
5110 *KEY507LEN:IM
5120 *KEY508LEN:IM
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5290 *KEY525LEN:IM
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5830 *KEY579LEN:IM
5840 *KEY580LEN:IM
5850 *KEY581LEN:IM
5860 *KEY582LEN:IM
5870 *KEY583LEN:IM
5880 *KEY584LEN:IM
5890 *KEY585LEN:IM
5900 *KEY586LEN:IM
5910 *KEY587LEN:IM
5920 *KEY588LEN:IM
5930 *KEY589LEN:IM
5940 *KEY590LEN:IM
5950 *KEY591LEN:IM
5960 *KEY592LEN:IM
5970 *KEY593LEN:IM
5980 *KEY594LEN:IM
5990 *KEY595LEN:IM
6000 *KEY596LEN:IM
6010 *KEY597LEN:IM
6020 *KEY598LEN:IM
6030 *KEY599LEN:IM
6040 *KEY600LEN:IM
6050 *KEY601LEN:IM
6060 *KEY602LEN:IM
6070 *KEY603LEN:IM
6080 *KEY604LEN:IM
6090 *KEY605LEN:IM
6100 *KEY606LEN:IM
6110 *KEY607LEN:IM
6120 *KEY608LEN:IM
6130 *KEY609LEN:IM
6140 *KEY610LEN:IM
6150 *KEY611LEN:IM
6160 *KEY612LEN:IM
6170 *KEY613LEN:IM
6180 *KEY614LEN:IM
6190 *KEY615LEN:IM
6200 *KEY616LEN:IM
6210 *KEY617LEN:IM
6220 *KEY618LEN:IM
6230 *KEY619LEN:IM
6240 *KEY620LEN:IM
6250 *KEY621LEN:IM
6260 *KEY622LEN:IM
6270 *KEY623LEN:IM
6280 *KEY624LEN:IM
6290 *KEY625LEN:IM
6300 *KEY626LEN:IM
6310 *KEY627LEN:IM
6320 *KEY628LEN:IM
6330 *KEY629LEN:IM
6340 *KEY630LEN:IM
6350 *KEY631LEN:IM
6360
```


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(Electron User)

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From Page 12

to carry out commands that are normally not available in Basic.

I'll give you some useful examples. Many programs, like Language Tutors and Hangman, have data statements that contain the words they use.

It would be an advantage if the number of words could be increased by the user under the control of the program.

This would require the use of the command LIST to find out where the new data statements must go. The new lines must then be added.

These two operations nor-

prompt is displayed. If LIST is entered the program will automatically list itself.

Any other entry will be placed in data statements at the end of the program. Running the program also sets six of the function keys for later use.

Keys 2 to 5 list programs in four different formats. You can combine the techniques to produce your own preferred output.

Key 6 displays the contents of the zero page user block. This is a useful tool for machine code programmers. Key 7 renubbers the program.

A useful technique that I

Another call, *FX201, is used to totally disable the keyboard (except for the Break key). It was designed for use with Econet systems which aren't yet available for the Electron.

Now let's go on to what are known as soft keys and firm keys.

The soft keys are those that we can program ourselves using *KEY0, *KEY1 and so on. They include the Copy and cursor keys.

The firm keys are those that are preprogrammed. On the Electron there are 29 keys that when used with the Func key produce Basic commands.

*FX226.1 makes them produce the Basic keyword printed on the front of the key.

*FX226.0 causes the keys to have no output. *FX226.x causes FUNC+key A to have an Ascii value of x. Func+B=x+1. Func+C=x+2 and so on.

*FX226 changes keys A to P and *FX227 has a similar influence on Q to Z and keys : ; , / - .

This technique increases the potential of the keyboard. Not only can the keys produce upper and lower case characters, but each key can produce a unique response if it is used with the Caps Lk/Func key pressed.

This is particularly important in database and word processing programs where all the letter keys are used to enter data and you need other combinations of keys for special purposes.

The pressing of a single key with the Caps Lk could, for instance, move blocks of text, dump information to printer or save data files on cassette.

The more sophisticated a program becomes the greater will the necessity for many function keys to be used. *FX226.128 and *FX227.160 give every key a different value ranging from 128 to 192.

Program V lets you see those values being produced. Simply hit the keys with or without the Caps Lk, Ctrl or Shift keys pressed.

And that's all for this month. We've looked at the osbyte calls concerned with the keyboard and seen how they affect the bell, change the action of the firm and soft keys and read the keys pressed.

● Next month we'll look at the Acorn Plus 1 and the calls associated with it.

```
10 REM PROGRAM V
20 *FX226.128
30 *FX227.160
40 REPEAT
50 PRINT GET
60 UNTIL FALSE
```

Program V

The more sophisticated a program becomes, the greater will be the necessity for many function keys to be used

ally cannot be carried out within Basic. Try writing the command LIST in a program.

To overcome the problem we can use the *FX138 call to place the instructions in the keyboard buffer. We then stop the program.

Lines 120 to 160 of Program III assembles that data and inserts it by using the osbyte call USR(&FFF4). The program automatically runs again after the DATA line has been entered.

Program III also shows how to place all the characters of a user-defined key into the keyboard buffer.

Line 100 inserts the contents of function key 4 by using *FX138.0.132. The Y value is equal to 128+the key number. Line 110 then stops the program running.

Here's how to use Program III. When it is run an input

use when writing or debugging programs is illustrated in Program IV.

The ON ERROR statement is placed near the start of the program. If an error occurs the program stops and displays the type of error and its line number.

When a key is pressed the screen is cleared and a paged mode listing is produced.

```
10 REM PROGRAM IV
20 ON ERROR PROCerr
30 DEFPROCerr
40 *KEY9MODE=INLISTIN
50 PRINTTAB(0,0);
60 REPORT
70 PRINT "at line ";ERL
80 G=GET
90 *FX138.0.137
100 END
```

Program IV

functions and instructions.

The action of these can be altered by use of *FX calls.

*FX225.0 causes the micro to ignore the function keys.

*FX225.1 makes the keys programmable (the default condition).

*FX225.x where x is greater than 1 causes the function keys to take on the Ascii value where f0=x, f1=x+1, and so on.

We can make each function key take on the value of its number by using *FX225.48.

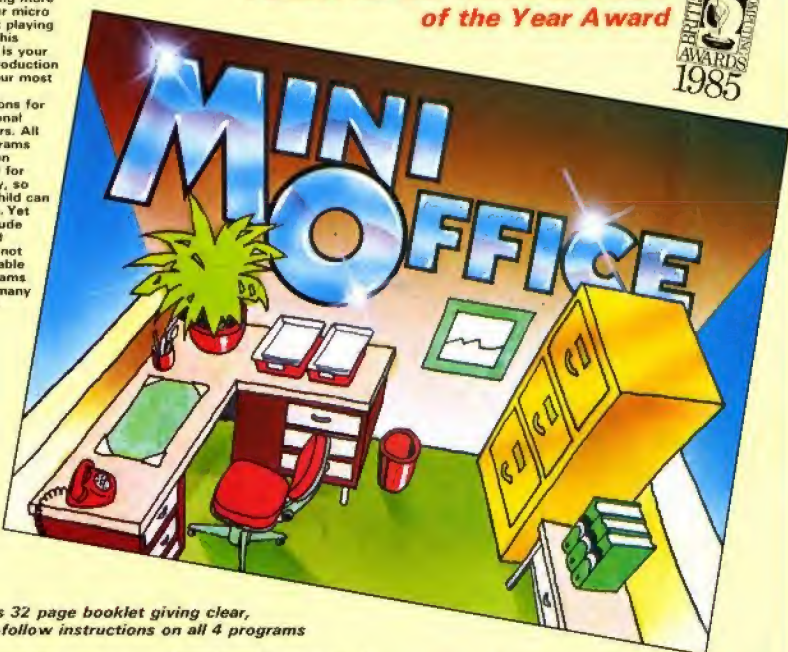
Now enter *FX4.2. The copy and cursor keys now produce the characters that follow the numbers on the Ascii table (see Appendix F of the Electron User Guide).

It is important to note that *KEY10 (the Break key) is not changed by this call.

*FX226 affects half of the firm keys in the same way.

If you want to start doing more with your micro than just playing games, this package is your ideal introduction to the four most popular applications for professional computers. All the programs have been designed for simplicity, so even a child can use them. Yet they include advanced features not yet available on programs costing many times as much!

**Finalist for the Home Software
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**Contains 32 page booklet giving clear,
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Word Processor: Ideal for writing letters and reports. There is a constant display of both time and word count, plus a words-per-minute display to encourage the budding typist! A unique feature is the double-size text option in both edit and printer mode – perfect for young children and people with poor vision.

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Spreadsheet: Enables you to use your micro for home accounts or pocket money records. It creates a display of numbers in rows and columns. Continuous updating is possible, and a changed figure can be instantly reflected throughout the rest of the spreadsheet. Your results can be saved, to be used for future updates, or can be fed into its associated program . .

Graphics: Part of the spreadsheet section, it lets you draw bar charts, pie charts and histograms to give a graphic presentation of your statistics. Helps to give life and colour to the duller figures!

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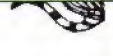



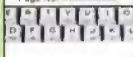


10
**Electron
Plus 1s**

5
**Cumana
disc
interfaces
+ drives**

5
**Slogger
Starmons**

Your FREE entry form

I consider that the nine cuttings from *Electron User* advertisements were taken from the following pages:

		
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I would like to see an article on: _____

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POST TO: Birthday Contest, *Electron User*,
68 Chester Road, Hazel Grove, Stockport SK7 5NY.

THIS month sees the second birthday of *Electron User* – and to celebrate we've a bumper collection of 142 presents to give away in our biggest, easiest-ever competition.

The prizes are amazing, covering the whole range of *Electron* products...

There are five *Electrons* to be won, courtesy of Acorn. In addition they've also sent us three *Plus 3s* and ten *Plus 1s* to give away to lucky winners.

Not wishing to be outdone, Cumana have donated five superb disc interfaces along with disc drives.

It seems as if all the leading lights of the *Electron* world are helping us celebrate.

Slogger are contributing two of their excellent ROM boxes and five Starmon machine code toolkits.

And joining in the spirit, Advanced Computer Products have more goodies for *Electron* users in the form of five Disc Toolkit ROMs, five ROM adaptors and two of their latest product, the Advanced Sideways ROM board.

3
**Electron
Plus 3s**

5
**ACP
Disc toolkit
ROMs**

**ACP 2
sideways
ROM
boards**

5
**ACP ROM
adapters**

100
**Mini Office
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**We've
142
prizes
worth
£4,311
to give
away!**



Yes, there's lots to win. And if all that weren't enough, Database Software are giving away 100 copies of their award-winning Mini Office packages.

The contest itself couldn't be easier to enter. We've taken pieces out of nine advertisements in this issue and put them in a numbered grid. All you have to do is find the page number of the original advertisement.

Now comes the bit where you use your brain. We'd like you to tell us, in not more than 25 words, what you'd like to read about in a future issue of *Electron User*.

Provided the page numbers are correct, the most original, entertaining or useful suggestions will go into the hat for the great Second Birthday Prize Draw.

That's not too hard, is it?

So get to work and let us have YOUR entry not later than October 31, 1985.

Remember, there are lots of prizes. So everyone has a good chance of getting an *Electron User* second birthday present.

DUNGEON QUEST

Zap the zombies and vanquish the vampires in this spine-chilling challenge by MATTHEW HOLROYD

YOU have been the wizard's pupil for many years now. He has taught you many magic skills and how to survive in the world of sorcery. Now at long last comes the end of your training program.

Having passed all the other

tests the wizard has invented for you, only one remains. You must be locked in the infamous Dungeon of Zalantar and find your way out again.

This is your biggest test yet and if you pass it and manage to escape from the deathtrap you will be awarded one of the



Magic Crystals of Kranblaton -- a trademark of all the Warlocks of the Dark Ring.

The game starts with you in the entrance hall, the room you must return to when you have all three magic keys.

Each room has a name and is a different colour, making it easier to find your way about.

The rooms contain different objects. Most have disgusting creatures which drain your strength.

Some rooms contain useful items and treasure which may be picked up.

Certain items can be used to tempt or threaten a creature which will then not harm you.

You may hold only six objects at one time. When you try to pick up a seventh you will lose the one at the right-hand side of the list.

To pick up an object you do

not need to touch it. Simply make sure you're in the same room as it and press G.

An odd sound should confirm the picking up and the object should appear next to the word "Objects" at the top of the screen.

The beasts and wizards will drain your energy at the rate of 10 units a second.

There are five different types of monsters and these are shown in the game. Two cannot be stopped and they will drain your energy no matter what you're holding.

The other three can be tempted or threatened with the objects you're holding, and these will not drain your energy if you're holding the right object.

For example, if you come across a vampire and you're holding a crucifix, then he



Dungeon Quest listing

```

1REN *** DUNGEON QUEST      ON*,0,40,20,0,0(3),5
***                          40DATA 1,"DEATHTRAP CELL
2REN *** BY M.HOLROYD      ",310,0,30,60,0(4),2
***                          50DATA 1,"RATIAK'S CELL
3REN *** (C) ELECTRON      ",0,60,0,60,0(5),6
***                          60DATA 2,"CHAOS HALL",40
4REN *** USER              ,0,50,90,0(6),5
***                          70DATA 1,"THE TORTURE CH
10DATA 1,"THE ENTRANCE H   AMBER",0,60,0,0,0(7),13
ALL",0,0,0,20,0(1),4       80DATA 1,"HALL OF HORROR
20DATA 2,"MURKY'S LAIR",  ",50,90,70,0,0(8),4
10,30,0,0,0(2),2          90DATA 2,"THE VAULT",60,
30DATA 1,"CORRIDOR OF DO  100,80,210,0(9),6
    
```


won't drain your energy.

If you pick up a magic key it replenishes your energy by 10.

We're sure your first few adventures will end in failure and you probably won't be able to get beyond a few rooms.

But don't worry - after a few goes you'll get used to looking in the corners of rooms to find out what's in them and when you've discovered how to keep the monsters at bay the rest is all a matter of finding the keys.

These are placed at random in the 33 different rooms of the castle spanning three different floors - the main floor, the attic and the dungeon.

The main floor contains a mixture of caverns and cells. The attic is made up of only cells. And the dungeon is made up of only caverns.

Staircases connect the floors, and there is also a tower somewhere.

The program starts with quite a nice wailing sound - which took hours to perfect - and it displays the characters.

The sounds are loud, frequent and can get annoying, so we've added a sound on/off option.

The controls of the man are quite simple and he can be moved in four directions.

To leave a room he must go through a door - a red block - which will be in at least one of the walls.

The control keys are:

- Z - Left
- X - Right
- : - Up
- / - Down
- G - Get an object

There are also some useful

options:

- S - Sound on
- Q - Sound off
- F - Freeze game
- R - Restart game

Several changes can be made to the adventure to give it a personal touch or just to make it easier.

If you find it too hard, just change the first line in PROCINIT. COPY the line out and where it says EN%=100 put:

EN%=200

This will mean you can survive twice as long as you start the game with twice as much energy.

If you find the game too easy, you may like to add more screens or change the number of keys to be collected.

You can, if you wish, make your own dungeon, maze or castle by drawing your own rooms.

All the information needed for each room is in the DATA statements at the beginning of the program.

It takes quite a while to do 33 rooms that all connect to each other, but you can have a go.

The format of the data statement is:

```
10 DATA room%,name$,up%,
right%,left%,down%,
object%,back%
```

room% is the type of room you wish it to be. It may be a cell (room%=1), a cavern (room%=2) or a staircase (room%=3).

name\$ is simply the name of the room. You may call it anything within 19 characters. Any longer and it won't fit on

PROCEDURES

init	Sets all the variables needed for each game. Defines the characters and envelope statements.
screen	Sorts out every screen. Jumps to drawing procedures depending on the data statement. Prints title at top of screen, displays score.
room1	Draws the cell. Is called by PROCscreen when room%=1.
room2	Draws the cavern. Is called by PROCscreen when room%=2.
room3	Draws the staircase. Is called by PROCscreen when room%=3.
checkob	Refers to a list of objects and prints the appropriate one in the room just entered.
left, right, up, down	These procedures move the man around the screen and jump to a new screen if he touches a door.
read	Reads all the data needed to produce a new room with the objects and monsters in it.
test	Tests to see if there is a monster in the room. If so, sees what you are carrying and acts accordingly.
update	Updates your remaining energy and the objects you are carrying. Prints them on the screen.
dead	Runs the dying sequence. Plays a tune. Transforms the man into an angel.
inst	Displays the characters used in the game and waits for the game to be started.
get	Controls the picking up of an object.
look	Looks to see if you are carrying the three keys when you enter the entrance hall.
win	Produces the winning screen.
freeze	Makes a ghostly sound every time the game is paused and waits for you to restart it.

the screen neatly.

Naming a room takes up quite a bit of memory, but it gives the room individuality. If you don't wish to name the room, just put "" in that space.

up%, right%, left%, down% are the line numbers that the data for the connecting rooms are on. This means that if up% was equal to 50 and the player went up the program would read the data on line 50 and draw him the new room.

Be sure to get the line numbers right for each room. It's best if you draw a map with all the essential information

included.

object% should be entered as O%(n) where n is the line number divided by 10. You should not change these to your own values as the keys may be in this variable and you could never get a key.

If the variable were on line 50 it would read O%(5) and so on.

back% simply holds the colour of the room. It is read in foreground colour which is then VDU 19d to make the room appear in that colour. To make the room appear green back% should equal 2.

```
100DATA 2,"THE CENTRAL CAVERN",0,110,90,0,0,10,3
110DATA 2,"CHAMBER OF DEATH",0,120,100,0,0,11,2
120DATA 2,"GRAVESTONE CAVE",170,130,110,0,0,12,6
130DATA 1,"ZOMBIES TOMB",0,0,120,140,0,13,5
140DATA 2,"CAVERN OF BONES",130,0,150,0,0,14,2
150DATA 1,"ESCAMIR'S HIDEOUT",0,140,0,160,0,15,9
160DATA 2,"THE TROLL'S CAVE",150,0,0,0,0,16,4
```

```
170DATA 3,"",180,0,0,170,0,17,4
180DATA 1,"THE LANDING",0,200,190,170,0,18,5
190DATA 1,"DRUID'S PLACE",200,180,0,0,19,2
200DATA 1,"THE GHUL'S DEN",0,0,0,190,0,20,4
210DATA 3,"",90,0,0,230,0,21,3
220DATA 2,"THE OGRE'S DEN",0,0,230,270,250,0,22,2
```

```
230DATA 2,"PORTCULLIS HALL",210,240,220,260,0,23,6
240DATA 2,"THE CELL",0,0,230,0,0,24,11
250DATA 2,"SLIMY HALL",220,260,0,0,25,2
260DATA 2,"THE SPIDER'S LAIR",230,0,250,0,0,26,5
270DATA 2,"VAMPIRE DUNGEON",0,220,0,0,27,6
280DATA 1,"THE CHAPEL",300,290,180,0,0,28,6
290DATA 2,"THE GRAVEYARD",0,0,280,0,0,29,0
```

```
300DATA 1,"THE BELFREY",0,0,0,290,0,30,2
310DATA 3,"",320,0,0,40,0,31,2
320DATA 3,"",330,0,0,310,0,32,4
330DATA 1,"THE TOWER",0,0,0,320,0,33,6
340MODES:DINOX(33):DINO#(6):PROCinit:PROCinst:PROC
```

Dungeon Quest listing

From Page 19

```

rad
350FORH=1TO6:DB$(H2)=CHR
$(32):NEXTH2
360COLOUR$=VDU25,1,0;0;0;1
0;PRINTTAB(X2,Y2):down9
370A$=INKEY$(0)
380COLOUR$=COLOUR128
390IFA$="I"THENPROCleft
400IFA$="I"THENPROCright
410IFA$="I"THENPROCup
420IFA$="I"THENPROCdown
430IFA$="B"THENPROCget
440IFA$="B"THENPROCfreeze
450IFA$="O"THENFX10,1
460IFA$="O"THENFX10,0
470IF timeZ=0THENPROCtes
t
480timeZ=timeZ+1
490FX10,0
500GOTO370
510END
520DEFPROCinit:GX=1:upZ=
10:ENI=100:IX=9:YZ=25:timeZ
=0:timeZ=1:timeZ=0
530FORBZ=1TO33
540OZ(BZ)=RND(5)+6
550NEXTBZ
560A=RND(33):OZ(A)=1
570A=RND(33):IFOZ(A)<7THE
NBOTO570
580OZ(A)=1
610A=RND(25)
620IFOZ(A)<7THENNBOTO610
630OZ(A)=4:OZ(A+RND(7))=4
640A=RND(28)
650IFOZ(A)<7THENNBOTO640
660OZ(A)=5:OZ(A+RND(5))=5
670A=RND(28)
680IFOZ(A)<7THENNBOTO670
690OZ(A)=6:OZ(A+RND(5))=6
700FX11,1
710FX12,1
720ENVELOPE1,2,1,-1,1,4,4
,3,1,0,-1,1,03,0
730ENVELOPE2,2,3,6,-9,2,3
,4,126,0,-126,126
740ENVELOPE3,7,6,7,8,5,6,
6,126,0,-126,126,126
750REM *** CROSS ***
760VDU23,224,24,24,126,12
6,24,24,24,24
770REM *** DAGGER ***
780VDU 23,225,840,860,870
,820,854,884,885,883

```

```

790REM *** KEY ***
800VDU 23,226,860,890,840
,838,884,882,885,882
810REM *** BOLD ***
820VDU 23,227,824,830,818
,824,846,842,846,830
830REM *** RIGHT ***
840VDU 23,228,838,870,860
,876,876,838,870,830,23,229
,880,810,880,830,836,836,83
6,837
850REM *** LEFT ***
860VDU 23,230,810,830,816
,876,876,810,830,830,23,231
,838,880,883,870,870,860,86
F,833
870REM *** UP ***
880VDU 23,232,880,810,810
,810,880,830,830,830,23,233
,876,841,810,830,836,836,83
6,837
890REM *** DOWN ***
900VDU 23,234,880,810,880
,810,880,830,830,830,23,235
,863,850,810,830,836,836,83
6,837
910REM *** DRACULA ***
920VDU 23,236,818,824,824
,818,824,830,866,866,23,237
,866,876,876,854,818,818,81
8,830
930REM *** WIZARD ***
940VDU 23,238,884,884,818
,818,824,824,818,818,23,239
,824,876,866,880,830,830,83
0,837
950REM *** HUNCHBACK ***
960VDU 23,240,838,846,880
,872,892,882,880,830,23,241
,863,866,866,816,836,836,83
6,837
970REM *** SKELETON ***
980VDU 23,244,842,842,854
,818,854,842,830,818,23,245
,830,818,818,824,824,880,82
4,866
990REM *** ZOMBIE ***
1000VDU 23,246,880,840,866
,876,824,824,824,830,23,247
,830,818,830,830,866,866,88
0,830
1010REM *** ANGEL ***
1020VDU 23,248,880,880,830
,842,830,880,818,830,23,249
,824,824,818,830,862,864,86
A,864,23,250,834,880,830,83
0,830,818,866,836
1030right=CHR$(228)+CHR$(
18)+CHR$(8)+CHR$(229):left=

```

```

=CHR$(230)+CHR$(18)+CHR$(8)
+CHR$(231)+up$=CHR$(232)+CH
R$(18)+CHR$(8)+CHR$(233):do
wn$=CHR$(234)+CHR$(18)+CHR$(
8)+CHR$(235)
1040drac=CHR$(236)+CHR$(1
8)+CHR$(8)+CHR$(237):wiz=
CHR$(238)+CHR$(18)+CHR$(8)+
CHR$(239):hunc$=CHR$(240)+C
HR$(18)+CHR$(8)+CHR$(241)
1050blank$=CHR$(32)+CHR$(1
8)+CHR$(8)+CHR$(32):skel$=C
HR$(244)+CHR$(18)+CHR$(8)+C
HR$(245):zomb$=CHR$(246)+CH
R$(18)+CHR$(8)+CHR$(247)
1060ENDPROC
1070DEFPROCscreen
1080SOUND,3,42,14:SOUND1,
3,40,14:SOUND3,3,20,14
1090VDU19,2,backZ,0;0
1100IFroomZ=1THENPROCroom1
1110IFroomZ=2THENPROCroom2
1120IFroomZ=3THENPROCroom3
1130IFupZ=0THENPROCdoorup
1140IFdownZ=0THENPROCdoor
down
1150IFleftZ(>0)THENPROCdoor
left
1160IFrightZ(>0)THENPROCdoor
right
1170BZ=0
1180VDU28,0,5,19,0,17,131,
12,26
1190COLOUR$=PRINTTAB(1,5);
name$=VDU5:MOVE250,1000:BCD
LB,4;PRINT"DUNGEON QUEST":M
OVE253,997:PRINT"DUNGEON QU
EST":GCOL0,1:MOVE256,994:PR
INT"DUNGEON QUEST":VDU4
1200VDU19,2,backZ,0;0
1210PROCupdate
1220IFnewX/10=1THENPROClook
1230ENDPROC
1240DEFPROCroom1:VDU17,130
,12,18,0,4,25,4,0;0;25,4,12
79;0;25,85,330;270;25,85,949;
270;18,0,25,4,0;0;270;25,5,
325;670;25,5,954;670;25,5,1
279;870;17,135,28,5,23,14,i
1,12,26:ENDPROC
1250DEFPROCroom2:VDU17,130
,12,18,0,4,25,4,0;0;25,4,12
79;0;25,85,330;270;25,85,949;
270;18,0,25,4,0;0;270;25,5,
325;670;25,5,954;670;25,5,1
279;870;17,135,28,5,23,14,i
0;0;25,4,0;0;100;25,4,300;180

```

```

;
1260VDU25,85,330;270;25,4,
1199;180;25,4,979;180;25,85
,949;270;18,0,4,25,4,330;27
0;25,4,300;270;25,85,400;31
0;25,4,949;270;25,4,779;270
;25,85,869;310;18,0,0,25,4,
0;0;25,5,0;200;25,4,1179
;30;25,5,1279;300;25,4,150;
130;25,5,50;500;
1270VDU25,5,170;740;25,5,0
;840;25,4,1139;120;25,5,116
9;500;25,5,1109;740;25,5,12
79;820;25,4,300;180;25,5,22
0;350;25,5,240;650;25,5,150
1675;25,4,979;180;25,5,1859
;350;25,5,1839;650;25,5,112
9;675;
1280VDU25,4,330;260;25,5,3
15;600;25,5,250;620;25,4,94
9;260;25,5,980;500;25,5,950
;600;25,5,1679;620;25,4,300
;270;25,5,450;580;25,5,779;
590;25,5,789;370;25,5,779;2
70;
1290VDU25,4,450;500;25,5,4
00;550;25,5,312;590;25,4,80
0;550;25,5,400;310;25,4,40
;310;25,5,910;540;25,4,779;
590;25,5,910;540;25,5,950;5
70;ENDPROC
1300DEFPROCroom3:VDU17,130
,12,18,0,132,24,180;0;1179;
100;16,26,24,220;180;1839;1
80;16,26,24,340;180;939;260
;16,26,24,460;260;819;340;1
6,26,18,0,0,25,4,330;260;25
,5,350;600;25,5,929;600;25,
5,929;260;25,4,350;600;25,5
,0;0;0
1310VDU25,4,929;600;25,5,1
279;800;ENDPROC
1320DEFPROCdoorup:COLOUR12
9;dx=19:REPEAT:PRINTTAB(9,d
x);"dx=dx+1:UNTILdx=24:
ENDPROC
1330DEFPROCdoorright:COLOU
R129;dx=23:REPEAT:PRINTTAB(
19,dx);"TAB(16,dx-1):"dx=
dx+1:UNTILdx=28:ENDPROC
1340DEFPROCdoorleft:COLOUR
129;dx=23:REPEAT:PRINTTAB(1
6,dx);"TAB(13,dx-1):"dx=
dx+1:UNTILdx=28:ENDPROC
1350DEFPROCdoordown:COLOUR
129;PRINTTAB(9,31);"dx=EN
DPROC
1360DEFPROCcheckob
1370COLOUR132;ix=32

```




LOOK at the Wigmore trackball and you see a large, square chunk of plastic with something like a snooker ball embedded in the middle.

It has two buttons at the top end so it can be used by either hand. Plugging into the joystick port on the Plus 1, it sits neatly by the side of the Electron.

The trackball is basically an alternative to an analogue joystick — for certain applications a joystick may be awkward and a trackball could be more suitable.

Handicapped users, for instance, would find it a lot easier to handle than either the keyboard or a joystick.

The position of the trackball can be read using ADVAL in the same way as a joystick, and returns the values a joystick would.

I tried it with Acornsoft's *Starship Command* and although it worked perfectly I found it difficult to play.

I couldn't recommend it for fast arcade games.

One area where it is useful is for graphics and design programs. *Mousepaint* is a program designed to work with the trackball and show just what it is capable of.

The program is quite a good drawing package. It runs in Mode 1 and any four of the eight steady colours can be

One way to have designs in the palm of your hand

ROLAND WADDILOVE tries out the Wigmore trackball

chosen.

Down the right hand side screen is a menu showing the options available. Letters and icons are used to represent the various functions.

To select an item from the menu the cursor — which is controlled by rolling the palm of your hand over the trackball — is moved over to one of the letters or icons and one of the fire buttons is pressed.

It is very simple and easy to use and only needs one hand.

Two of the menu options allow freehand sketching and painting.

The size of the paintbrush can be set and then, by holding down the fire button, you can paint on the screen by rolling the trackball.

Both solid and dotted lines can be drawn using a rubber band technique. If the cursor

isn't steady enough you can select an option to straighten the line to the vertical or horizontal.

Circles and ellipses can be drawn by selecting the appropriate icon from the menu.

To draw a circle you move the cursor to the centre, press one of the buttons, move to the edge of the circle and press again.

Rectangles are drawn using a rubber banding technique. After setting the bottom corner the box alters in size as the cursor is moved. Pressing Fire fixes it in a particular spot.

The only time the keyboard is touched is when text is to be placed on the screen. A small text window at the bottom is used for input and messages.

After pressing Return the text is placed by moving the cursor to the desired position

using the trackball and pressing Fire.

A simple fill option can be used to colour in shapes. A short routine is used to run from the lowest to the highest point in the shape, filling it using PLOT 77.

If the shape is very complex several fills may be required.

The software isn't protected and is almost entirely in Basic so you can tinker about with it and see how it works. Several routines could be included in your own programs.


The trackball, plus software, is quite a nice package. The graphics program is easy to use and the trackball itself is well made.

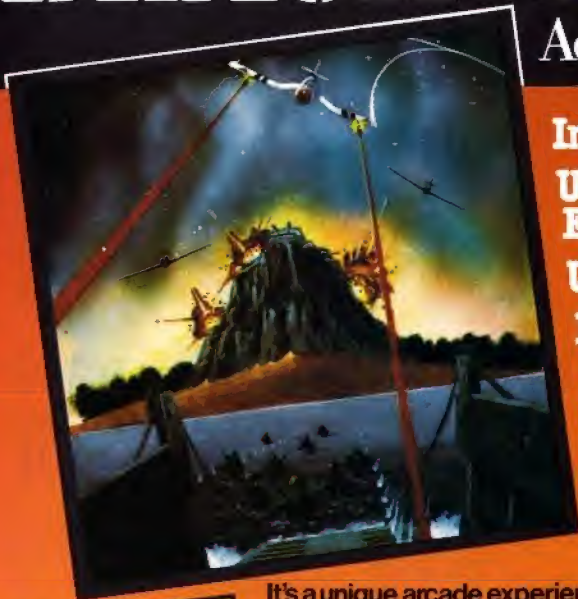
Although its use is rather limited, combined with the design program, I found the trackball great fun to use.

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JAN	99A:
1M:-3,- 3, MINUS3, MINUS 3,	100J: *5
82BY:1	101: *3A
83JN: *5A	102M: 5, '
84T: 6000, NOW TYPE ANOTHER	103SN: -2
85A:	104SY: 1
86M: 5, '	105TN: TRY AGAIN
87JN: *5B	106JN: *5
88: 5C	107T: 6000, WHAT IS THE OTH
89SY: 2	R 7
90T: EXCELLENT, MAX SCORE 1	108A:
6 14	109M: -3,- 3, MINUS3, MINUS 3,
91T: PRESS RETURN TO FIND Y	110JY: *5C
OURS	111T: CORRECT IS -3 (MINUS 3)
92A:	112J: *5D

CHUCK Carpenter published a version of a Pilot interpreter written in Basic for the Apple II which he had modified from a public domain Pilot program of N. Dealey. I re-wrote and extended this version which was published in *Apple User* in September 1984.

It is rather surprising that no version of Pilot seems to be available for the Electron despite the fact that the Pilot language was originally written for teachers to help them produce computer-aided learning programs.

Perhaps one reason for this is that the "super" Pilot such as that available on the Apple is even more complicated to learn than Basic.

One advantage of a simple Pilot is that beginners in programming can be more easily initiated into the techniques of simple program structures.

The disadvantages are that it does not allow subroutines/procedures nor any form of mathematical calculation.

However, for the teacher who wishes to make up simple quizzes or tutorial material on a question/response basis, this simple Pilot may save considerable time when compared with a similar program written in Basic.

The version described here is based on the Apple version—lines 500-4900 are identical—which is why GOSUBs are used instead of PROCedures.

It requires only a few simple and letters with a

Take a structured approach to make a Pilot program

GORDON MILLS presents an Electron version of this powerful education tool

full-stop to build patterns spread over a number of lines.

All the main commands can be modified by Y or N immediately following the command symbols and before the colon. This causes the command to operate only if: *The modifier is Y and the last Match is positive, Or: The modifier is N and the last Match is negative.*

Additional symbols used are * to precede labels of lines to which the programmer wishes to jump and S to precede string labels in lines accepting user input. These can be used later in the program in text lines.

Examples of their use are given in Program I and in the instructions contained within Program II.

When using the Match command more than one

to start a new program. All other commands are self-explanatory.

- Improved editing by allowing the insertion and deletion of lines in a Pilot program.
- An option for the Pilot program to be listed on a printer.
- Paged screen listing of the Pilot program.
- Maximum number of Pilot

program lines is 400. This could be enlarged further if required by increasing the value of MX in line 130, alternatively, initialising/editing delays could be reduced by decreasing MX.

- Instructions and commands together with a sample Pilot program included within the Basic program.
- The addition of a Score

Electron Pilot: Program I

```

0#1
1C:
2T:IF AN INDIAN WOMAN IS
A SQUAW
3T:WHAT IS AN INDIAN BABY
?
4A:
5M:PAPDOOSE,PAPDOOSE,PAPPO
OS,
6MN:SQUAWKER,
7SY:3
8TY:GOOD
9T:THE JOKE ANSWER IS SQU
AWKER
10T:NOW PRESS RETURN
11A:
12#2
13C:
14T:HOW MANY KINGS HAVE BE
EN
15T:CROWNED IN ENGLAND SIN
CE
16T:1500 AD ?

17T:
18T:A - ONE
19T:B - 15
20T:C - 16
21T:
22T:TYPE A OR B OR C
23A:
24M:A,
25TN:ANSWER A IS CORRECT B
ECAUSE
26T:ONLY JAMES I WAS ALREA
DY KING!
27SY:2
28SN:-1
29T:PRESS RETURN
30A:
31#3
32C:
33T:WHAT WAS THE LARGEST I
SLAND
34T:BEFORE AUSTRALIA WAS
35T:DISCOVERED ?
36A: $ANSWER

```



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Thursday to Sunday, November

command, S: which can be followed by any number – positive or negative. If the Score number is less than 999, than that number is added to the current score; if 999 or greater, the score is reset to zero. At the conclusion of the program, the score is printed out.

● A facility for Pilot programs to be saved to and loaded from cassette.

When writing or editing a program, to tell the micro that you have finished type DONE on the next line – without a colon – and you will be returned to the menu. Don't forget that you will need the command E: to end the program you are writing.

One of the simplest uses for Pilot in education is to present simple knowledge tests.

Program 1 is intended to illustrate how program structures can be developed from the simple to the more complex, thereby providing an ideal teaching medium for beginners.

Question 1 allows one attempt only. Question 2

shows how a multiple choice question can be written.

Questions 3 and 4 allow the user any number of attempts but it is important to include, as in Question 4, the option (?) to escape from what would be an endless loop if the answer is not automatically given after the user response.

Question 5 shows how to obtain two answers from one question. This involves a much more complex structure than the previous questions.

The five types of questions demonstrated in Program 1 can serve as a model for similar questions in any discipline.

This Mini Pilot interpreter, although written in Basic, is surprisingly fast. The only delays – of several seconds – occur on initialising, also when LOADING from tape and when inserting blank lines or deleting lines (under EDIT).

Also, the modular construction allows the expert programmer to readily experiment with additional commands if desired.

Now is your chance to

TABLE OF COMMANDS	
T:	Text line.
A:	Accept user input.
M:	Lists of strings to check if there is a Match with the last user input.
J:	Jump to another line.
C:	Clear the screen.
R:	Remark or comment line.
E:	(or END:) End the Pilot program.
S:	Allows a score to be kept (that is requires a number).
DONE	To end writing a program and return to menu.

Table 1:

experiment with a simplified Pilot.

It may be that more elaborate versions are on the way, but this is a cheap method of finding out whether you think a more expensive Pilot with graphics and mathematical facilities could be a

worthwhile acquisition.

I hope you and your friends – or pupils – don't groan too much at the riddles in Program 1.

**Program 11
on next page**

```
37M:AUSTRALIA,
38T: #ANSWER IS WRONG
39S:-1
40T:CORRECT IS STILL AUSTRALIA!
41SY:3
42T:NOW PRESS RETURN
43AN:
44JN:43
45T:GOOD. NOW PRESS RETURN
46A:
47+4
48C:
49T:IF YOU REALLY DON'T KNOW THE
50T:ANSWER TO THE NEXT QUESTION,
51T:TYPE ?
52+44
53T:MAKE ONE WORD FROM THE LETTERS
54T:NEW DOOR
55A:
```

```
56M:ONE WORD,ONEWORD,
57T:GOOD. NOW PRESS RETURN
58
59AY:
59BY:3
60JY:45
61M:?,
62SY:-1
63SN:1
64T:TRY AGAIN. PRESS RETURN
65AN:
66JN:44
67T:THE ANSWER IS THE 2ND AND 3RD
68T:WORDS OF THE RIDDLE!
69T:PRESS RETURN
70A:
71C:
72JY:44A
73+5
74T:A QUESTION WITH TWO ANSWERS
```

```
75C:
76T:WHAT CAN BE ADDED TO NINE TO
77T:MAKE SIX ?
78T:TYPE ONE OF TWO POSSIBLE
79T:ANSWERS
80A:
81M:-3,-3,MINUS3,MINUS 3,
82SY:1
83JN:45A
84T:GOOD. NOW TYPE ANOTHER
85A:
86M:S,
87JN:45B
88+5C
89SY:2
90T:EXCELLENT. MAX SCORE IS 514
91T:PRESS RETURN TO FIND YOURS
92A:
```

```
93EY:
94+5B
95T:CORRECT IS S. (5 + 1X = SIX)
96+5D
97SN:-2
98T:PRESS RETURN
99A:
100J:45
101+5A
102M:S,
103SN:-2
104SY:1
105T:TRY AGAIN
106JN:45
107T:GOOD. WHAT IS THE OTHER ?
108A:
109M:-3,-3,MINUS3,MINUS 3,
110JY:5C
111T:CORRECT IS -3 (MINUS 3)
112J:45D
```

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```

NTJ: JUMP TO LABEL (STARTI
NG 4)
1970V=1:60SUBS200:PRINT"C
: CLEAR THE SCREEN"
1975V=13:60SUBS200:PRINT"R
: REMARK OR COMMENT"
1980V=14:60SUBS200:PRINT"S
: + OR - NUMBER TO ADD TO S
CORE"
199060SUB4700:Z=10
200060SUB5000:PRINT"Y OR N
ARE MODIFIERS AFTER MAIN"
2010V=2:60SUBS200:PRINT"CO
MMANDS (AND BEFORE :) TO GI
VE"
2020V=1:60SUBS200:PRINT"AC
TION IF THE LAST MATCH WAS"
2030V=4:60SUBS200:PRINT"CO
RRECT (Y) OR INCORRECT (N)"
2040V=6:60SUBS200:PRINT"*
IS USED BEFORE EACH LABEL"
2050V=6:60SUBS200:PRINT"*
MUST PRECEDE A STRING LABEL
IN"
2060V=9:60SUBS200:PRINT"A:
LINES IF IT IS TO BE USED"
2070V=10:60SUBS200:PRINT"L
ATER IN (SAY) T: LINES"
2080V=12:60SUBS200:PRINT"E
: OR END: STOP THE PILOT R
UN"
2090V=14:60SUBS200:PRINT"D
ONE IS USED TO END INPUT MO
DE"
210060SUB4700
211060SUB5000:PRINT"SAMPLE
PROGRAM":PRINT
2120PRINT" 07R:NAME INPUT
":PRINT" 1?BEGIN":PRINT"
2130PRINT" 37A: $NAME":PR
INT" 47N: SUPERMAN, SUPERWO
MAN,"
2140PRINT" 57Y: DON'T BE
FACETIOUS":PRINT" 67JY: BE
GIN"
2150PRINT" 77T: HELLO, $NA
ME":PRINT" 87END:"
2160PRINT:PRINT"ALWAYS PUT
A SPACE BEFORE $":60SUB470
0:RETURN
3000REMARK
3010PRINT"  ":P=P*(1,1,A
):L=LEN(P):FORK=1 TO L

```

```

3020IF MID(P,K,1)<>"$" THEN
N3300
3030I=(B,F)=MID$(P,K,1):60S
UB6100:I=1(I,F)=A$:I=A$:F=F
+1:K=L:NEXTK:RETURN
3040NEXTK:60SUB6100:I=A$:
PRINT:RETURN
3100RENTYPE
3120P=P*(1,1,A):L=LEN(P):F
ORK=1 TO L
3130IF MID(P,K,1)="*" THEN
3150
3140NEXTK:60SUB3200:RETURN
3150FORK=L TO L+1
3160IF MID(P,K,1)="*" THEN
3170NEXTK:K=L:NEXTK:60SUB3
220:RETURN
3180U=V:V=MID$(P,K,U-K)
3190FORK=F-1 TO 0 STEP-1
3200IF V<>I:(H,0) THEN NEXTH
60TOS3200
3210PRINT MID$(P,I,K-1):I
(1,H):MID$(P,U,L-U+1):H=0:
NEXTH:K=L:NEXTK:RETURN
3220PRINT P:RETURN
3300REMATCH
3310M$="N":N=1
3320P=P*(1,A):L=LEN(P):F
ORK=1 TO L
3330IF MID(P,E,1)<>D$ THEN
N3370
3350IF MID$(P,N,E-N)=Z$ THEN
N3410="Y":E=L:60TOS3300
3360N=E+1
3370IF MID$(P,E,2)="* ORMI
D$(P,E,1)="* THEN E=L
3380NEXT E:RETURN
3400REJUMP
3410Q=0:FOR D=0 TO MX
3420IF P$(Q,D)<>"* THEN 3440
3430IF MID$(P,(1,A),1,LL)=M
ID$(P,(1,D),1,LL) THEN A=D:D=
MX:NEXTD:RETURN
3440NEXTD:V=V+1:60SUB5200
3450PRINT:PRINT"JUMP TO UN
FOUND LABEL FROM LINE $":A:
Q=1:V=V+1:RETURN
3500REMCLEARSCREEN
351060SUB5000:RETURN
3600REND
3610A=M:RETURN
3700REMSCORE

```

```

3710TS=VAL(P*(1,A)):IF TS
998 THEN SC=TS:RETURN
3720SC=SC+TS:RETURN
430060SUB5000:PRINTMX;" IS
THE LAST POSSIBLE LINE." :P
RINT
4310PRINT"DISK DRIVE USERS
MAY CONTINUE":PRINT"BY SAV
ING THE PILOT PROGRAM"
4320PRINT"AFTER INPUT OF T
HIS LINE $:MX:PRINT:PRINT"
HEN AMEND LINE 130 OF THE"
4330PRINT"PILOT INTERPRET
ER TO INCREASE:PRINT"THE VA
LUE OF $:MX BEFORE RELOAD"
434060SUB4700:60SUB5000:Z=
10:RETURN
440060SUB5000:PRINT"STARTI
NG AT LINE ? ":1:60SUB6100:C
=VAL(A$)
4410IF C<1 AND A$<>"0" OR
C>MX THEN 4400
4420RETURN
4500FORA=0 TO MX:P$(0,A)=""
:P$(1,A)="" :NEXT:RETURN
4600REMPAGING LIST
4610IF C<1 THEN RETURN
4620C=C+1:60SUB4700:60SUB50
00:V=1:H=6:60SUB5200:PRINTC
P$:RETURN
4700REMPRESS SPACE BAR
4710V=23:H=1:60SUB5200:PRI
NT"PRESS SPACE BAR TO CONTI
NUE":
472060SUB6000:IF C<>32 THEN 4
720
4730C=0:RETURN
4800REMSSET TABS FOR LINE N
UMBERS
4810V=V+1:H=1:IF C=10 THEN H
=2
4820IF C=10 THEN H=3
483060SUB5200:PRINT"
4840IF I=10 THEN 4850:PRINT"*
:NEXT:RETURN
5000CLS:RETURN
5200VDUI,H-1,V-1:RETURN
6000A=BET$B=ASC(A$):RETU
RN
6100REINPUT CHECK
6110S$=""
612060SUB6000:X=ASC(A$)
6130S=LEN(S$):IF X=127 AND
S THEN S=LEFT$(S,S-1):PRIN

```

```

TAS:60TOS120
6140IF X=127 THEN 6120
6150IF 1=13 THEN PRINT:A$=S$:
RETURN
6160IF X=31 AND X<91 AND S<LL
THEN S$=S+A$:PRINTA$:
617060TOS120
6300REMPRINTER ON
6510PRINTCHR$(2):RETURN
6600REMPRINTER OFF
6610PRINTCHR$(3):RETURN
6700REMPREPLACEFILE
671060SUB5000:PRINT"DO YOU
WANT TO DELETE THE EXISTIN
G FILE":PRINT:PRINT"OF $:P$
" ?
6720PRINT:PRINT"PRESS Y OR
N"
673060SUB6000:IF C<>89 AND
C<>78 THEN 6730
6740IF C=78 THEN Z=10:RETURN
6800RENDISKSAVE
6810FORA=MX TO 0STEP-1:IF P$
(0,A)="" AND P$(1,A)="" THEN NE
XT
6820X=OPENOUT(CP$)
6830FORI=0 TO A
6840PRINTX,P$(0,I)
6850PRINTX,P$(1,I)
6860NEXT
6870CLOSEX
6880RETURN
6900RENDISKLOAD
690560SUB5000:INPUT"PROGRA
M NAME $:CP$:PRINT"WAIT":60
SUB4500
6910V=OPENUP(CP$)
6915A=0
6920REPEAT
6930INPUTY,P$(0,A)
6940INPUTY,P$(1,A)
6950A=A+1
6960UNTIL EOFY
6970CLOSEY
6980RETURN
7000FORI=1 TO 2000:NEXT:RE
TURN
8000END

```

This listing is included in this month's cassette tape offer. See order form on Page 61.



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Games

Title	Supplier	Description
Alien Dropout	SUS	Shoot the aliens before they fill the boxes. Prevent them shooting down and exploding.
Answer Back - Sport	KSL	Combines high-speed football and tennis games with 26 immense sports quizzes. Fully reprogrammable, includes multiple-choice, true-false modes.
Arcade	ACS	A fast moving arcade space game, your task being to demolish the onslaught of warning aliens.
Arena 3000	MID	Fight wave after wave of aggressive Cyborgs in this Robocon-style game.
BBC Micromind	MIS	Your own version of the famous TV quiz, faithfully reproduced on your computer screen. Create your own quizzes on any subject.
Bird Strike	FI	Arcade action.
Blagger	ALS	Classic Arcade game.
Blitzwing	SOI	Finely detailed 3D tank battle with fast moving real time graphics, scrolling landscape, revoking tanks.
3D Bomb Alley	SOI	A realistic 3D simulation of an explosive air-sea battle. Defend your fleet from attacking enemy aircraft.
Boer	ACS	You are in the gym trying to catch balloons. Avoid falling weight and punch or jump over hammers thrown down from the referee.
Brain Aerobics	MBS	Brain games for card players - four complete exercises.
Brian Jacks Superstar Challenge	MSL	Brian challenges you to eight different events designed to test the players skill, coordination and stamina.
Bridge-Memmor	MBS	Contract Bridge, card play and archive
Bug Flys	ISL	Daringly lead through 10 levels of the invading spaceship to destroy the master generator, Mosa 1.
Bumper Boodle	ALS	Four games on one tape, three arcade plus one adventure.
Cassette-50 for the Election	CAG	50 fabulous games.
Cassir Frankenstein	EPS	Classic machine code text adventure. Over 200 locations. Find and destroy the monster.
Cavalier Capers	ISL	Help Ogg ride Kickstart the Turtle, avoiding pre-historic hazards. Hilarious fun game.
Centibug	SUS	Shoot the centibug, weaving through the maelstroms, features include spiders, snails, flies and increasing difficulty.
Chess	ACS	A fast playing program with high resolution graphics with 10 levels of play.

Games

Title	Supplier	Description
Superfruit		Far and away the best adaptation I have seen on the fruit machine theme! (Electron/Dec October 1984).
Supergolf	SS	Choose club, play the hole, watch it's aching flight. 18 holes One touch players.
Super Pool	SOI	Superb real time colour graphics. Time restricted shots. Variable cue strength. Three levels of play.
Swordmaster	MIL	Sword duelling game for two players.
Tempest	SUS	UFOs with a blaster and super zap.
Test Match	CRG	Simulation of a five day test match in colour. Animation and real machine code.
The Challenge	MBS	Bridge hands cassette for bridge mentor.
The Complete Cocktail Maker	ACS	Amaze your friends with your versatility in making cocktails.
The Hacker	FI	Machine code arcade action.
The Joffe Plan	MIS	The loser wins in this interactive weight control program with helpful manual.
The Living Body	MSL	Six separate programs plus 32-page colour booklet based on TV series.
The Mating Game	ACS	Entertaining game for parties including computer dating, love style and dating skills.
The Official Eddie Kidd Jump Challenge	MSL	Motorable jumping game developed with the help of the world's best.
Theatre Quiz	ACS	Pack contains program cassette, quiz data cassette and instruction booklet.
Traditional Board Games	DAC	Six different board games from around the world. One or two players.
Trafalgar	SS	Strategy game as admiral manoeuvring fleet.
Vortex	SOI	3D voyage into space, encountering aliens, asteroids and the vortex.
Watch Your Weight	ACS	Dieticians have produced a definitive diet for health.
West	TCS	Test adventure set in a Wild West ghost town.
Wheel of Fortune	EPS	Epic fantasy adventure. Intelligent characters and a host of sophisticated features.

Games

Title	Supplier	Description
Philosophers Quest	ACS	Advanced adventure game with a world of fiendish puzzles to be solved.
Planetoid	ACS	Fast-action graphics game. Save the life forms from their attackers and return them safely to their planetoid.
Plus 3 Games - Maze, Firebug, Planetoid	ACS	Fast loading machine code arcade action.
Polar Perils	SS	Voracious polar bears, unstable icebergs, drifting icebergs. Arcade action requiring superb timing and reactions.
Pyramio/Casino	GAC	Computer versions of the popular card games. Excellent graphics.
Quest for the Holy Grail	EPS	Classic machine code text adventure. Over 200 locations. Find the Holy Grail and return to Camelot.
Reversi	SUS	Board Game in which you move discs to trap your opponent. Five ball levels.
Royalty Quiz	ACS	For royalists and republican alike.
SAS Commander	COM	Shoot terrorists, save hostages and restore freedom to siege-stricken streets.
Science Fiction Quiz	ACS	Science fiction in its widest sense. Author is Brian Aldiss.
Score-Bridge	MBS	Tournament scoring for duplicate bridge. Individual Howell and Mitchell competitions.
Sim	CSM	Arcade-graphic adventure with over 70 screens.
Smsash & Grab	SUS	Collect the bags of gold and try to avoid the policeman who's out to catch you.
Snapper	ACS	Guide Snapper through a maze eating dots and fruit and avoiding monsters.
Snooker	ACS	Play and score at a real game using the cue for back spin and top spin in addition to ordinary shots.
Snooker	CSM	Simulation.
Soccer Supremo	QSD	Strategy/tactical game as a first division manager with a five year contract.
Space Shuttle	MID	Fly the shuttle through launch, recovery and landing.
Sphinx Adventure	ACS	Full size classic adventure game.
Stranded Adventure	SUS	Stranded on a strange planet, can you get back to Earth? Includes hi-resolution graphics.

Games

Title	Supplier	Description
Chess	SUS	High quality program which features numerous game options, choices of ball and levels of play.
Chuzzle the upgrade for Chuzzle Egg	BIT	Creative educational and fun. Usual features plus eight new screens. Design your own screens. A n F approved.
Combat Lynx	DUS	Air to ground battle simulation.
Countdown to Doom	ACS	A mind-boggling adventure in which you must repair your ship and collect treasure as the clock ticks away.
Contract Bridge	ALS	Card game.
Crazy Tracer	ACS	Guide your paint roller round the edge of a maze of rectangles.
Crime and Detection Quiz	ACS	The author Julian Symonds is the author of 21 crime novels.
Custard Pie Flight	COM	Pie throwing chucks in kitchen. Hilarious fun, splatting sounds, various speeds, one or two players.
Dare Devil Dennis	CSM	Stunt game.
Death Pit	DUS	Arcade adventure through massive underground cavern complex.
Doctor Soft's 247 Flight Simulator	DS	Airline flight simulation, colour graphics and sound. 3D outside view, runways at Gatwick and Heathrow.
Dogfight	SL	Two player aerial combat game. Sun, moving cloud, ground, very exciting.
Dominos	GAC	Three computer versions of domino games for one or two players.
Draughts	SUS	Changing skill/speed levels, sophisticated option for solving problems and re-start and move recall.
Drain Mania	ISL	Lost down the sewers you must collect coins avoiding beasts.
Draughts and Reversi	ACS	Draughts plus board game where you take as many pieces as possible by surrounding your opponent's pieces.
Zalaga	APS	Disastrously fast arcade-style game. Terrifying, exhilarating, button-popping, adrenaline-pumping.
Elite	ACS	New generation of 3D space games featuring inter-stellar travel in a distant cluster of galaxies.
Empire	SHS	Strategy game played on a world map with eight difficulty levels.
Fantasia Diamond	MC	Colourful graphic adventure with a vocabulary of over 300 words.

Games

Title	Supplier	Description
Firebug	ACS	Rescue buckets of highly inflammable liquid and carry them to the water tank while the fire bug rushes round lighting fires.
747 Flight Simulator	DAL	Detailed graphic simulator with over 40 instruments and dials plus 3D pilot's view.
Fligi	ISL	New concept in computer games – cartoon strategy. Exciting and fun combination of entertainment and education.
Football Manager	AOL	All-time classic, a football management simulation strategy game.
Frankenstein 200	ISL	Journey through the monster's body activating biotic implants avoiding biological breaches.
Freeball	ACS	As only crewman in the space station you must kill as many aliens as possible by ramming, kicking or punching them.
Fruit Machine	SUS	Ever popular favourite. Features include: Mod, Nudge, Gamble.
Globurner's Castle	MSL	Machine code graphic arcade adventure with hundreds of different locations, joystick or keyboard.
Go	ACS	Ancient Chinese game of strategy on a 13 x 13 matrix.
Guardian	ALS	Classic space shoot out.
Gunsome	SOI	A realistic 3D wild west street gun battle, defend yourself against 16 enemy assassins.
Heathrow Air Traffic Control	HC	Accurate and exciting simulation of the role of an ATC in the world's busiest airport.
History Quiz	ACS	There are 298 questions in this quiz which covers all aspects of British history.
Hopper	ACS	Hop the frog across the busy motorway and leap on logs and lurches crossing the river to the frog-her.
1 Do	ACS	This package is based on Hans Eysenck's book "1 Do" or guide to a happy marriage.
Invasaders	SUS	The classic game where marching invaders destroy your defences with bombs. Superb graphics and sound.
Jungle Jive (BBC on Side 1 and Election on Side 2)	VOI	You are armed with a rifle to try and fend off jungle beasts.
Killa, upgrade for Killer Gorilla	BIT	Variable extended jump, practice mode, level selection.
Kingdom of Man	EPS	Classic machine code text adventure. Over 200 locations. Discover the witch's secret and destroy her.

Games

Title	Supplier	Description
Know your own Personality	MIS	See how compatible you and your friends are with Eysenck's personality tests.
Know your Own Psi-Q	MIS	Test and develop your latent psychic powers with some fun games too.
Landing Perry	TWI	Deep space search and rescue. Strategy game to find missing officer, 1000 locations.
Laser Reflex	TCS	New angle in alien-zapping.
Linkword French	ACS	Connect words associated between words and images to provide the unique and imaginative approach to learning a foreign language.
Linkword German	ACS	As above.
Linkword Italian	ACS	As above.
Linkword Spanish	ACS	As above.
Maze	ACS	You have to find your way round the maze of corridors while avoiding or killing robot guards – 3D graphics.
Memoirs	ACS	Manoeuvre your laser ship through a hall of mirrors, smashing them with your laser bolts.
Middlecross	SHS	Original graphical adventure with advanced features. You explore, detect and defend in a pleasant country town.
Mineshift	DUS	Mantic Mine type of game.
Monsters	ACS	You are pursued by monsters chased up and around ladders and along walls.
Monsters, upgrade for Monsters	BIT	Variable extended jump, user defined keys, conveyor belts.
Mr. Wiz	SUS	Grimlin is chasing Mr. Wiz around the orchard but he has a crystal ball for protection.
Music Quiz	ACS	Amusing and fascinating quiz for lovers of Bach, Beethoven, Debussy and the Bee Gees.
Mystery of the Jive Star	SHS	Four part educational adventure in which you must recover buried treasure.
Overdrive	SUS	Thrilling 3D race for the world desert championship. Night, snow, desert and riverside scenes.
Paul Daniels Magic Show	ACS	Ten magic tricks and some simple props.
Percy Penguin	SUS	Trapped in the ice-maze, Percy survives the snobs by hurling chunks of ice at them.
Penguins' Diary	SHS	Family adventure spanning three continents.

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If you cast your mind back to last month, you'll remember that we dealt with strings. In particular you'll recall that we learnt about the Basic functions CHR\$, ASC, and LEN. So if I want you to find the LEN of a concatenation of CHR\$ I hope you'll understand what I'm ASCIIing you for.

This month we'll be taking a further look at string variables and seeing how they can be changed into numbers and vice versa. We'll also be learning why we should want to do it in the first place.

Before we start, however, it's important that you grasp the difference between a number and a string. If you can't explain the differing results obtained from:

```
PRINT 2+2
```

and:

```
PRINT "2+2"
```

then you'd better re-read some of the very first articles.

However by now most of you will see that the first PRINT takes the 2+2 as numbers, adds them and displays the answer. The second PRINT finds the inverted commas and displays, unchanged, everything that follows until it comes across another set of inverted commas.

To be formal, 2+2 is treated as an expression, or sum, while "2+2" is treated as a string. A string is just a collection of letters, punctuation marks, spaces and numbers, all treated as one lump.

We tend to think of strings as collections of letters such as:

```
name$="Peter"
```

where the string variable *name\$* holds the letters that make up my christian name. However, combinations of letters and numbers such as:

```
name$="CSP0"
```

or even strings that are all numbers, as in:

```
name$="666"
```

are allowed. It's strings made

up of combinations of letters and numbers, and the Basic functions that deal with them, that we're concentrating on this time.

The first function we'll look at is STR\$. This is used to change a number into a string. To convert the number 3 into a string variable called *fred\$* we use:

```
fred$=STR$(3)
```

When you enter:

```
PRINT fred$
```

you'll find that it now contains 3. Notice, however, that it's a string variable. The Electron

the expression inside the brackets is worked out before STR\$ converts the lot to a string.

Using STR\$ on negative numbers helps to highlight the difference between strings and numbers. It should come as no surprise to find that entering:

```
abc=-1.23
fred$=STR$(abc)
```

results in the string variable *fred\$* holding the string -1.23. When you find the length of the string with:

```
PRINT LEN(fred$)
```

it's given as five. The string

using STR\$. You can use an INPUT, as Program 1 shows.

This amazingly trivial program asks you for a number and a street name and then prints out the address. It's hardly epic programming but it does make a point or two, so let's take a closer look at it.

Line 20 asks for the house number and stores it in the string variable *number\$*. There we have a number being turned into a string courtesy of INPUT. The next line puts the street name in *street\$* and line 40 concatenates (joins) the two together, putting the result in *address\$*. The CHR\$(32) sandwiched between them is just there to separate the number from the name. Notice that *address\$* is holding two pieces of information (the street and the house number) in just one variable. There'll be more about this later.

As you'll find out if you try:

```
PRINT numbers+2
```

while *number\$* may hold a number, you can't do maths with it. In the program above this may be all right but for more complicated examples we may need to use the house number in our calculations as in Program 11. This asks for a street and number as before, but now the FOR ... NEXT loop ensures that the 26 addresses on that side of the road are displayed.

It's very similar to Program 1, but notice that now the house number is held in the numeric variable *number*. This is because we'll be using *number* to determine the

By PETE BIBBY

won't like it if you try to do maths with it.

```
PRINT fred*3
```

results in the "type mismatch" error message, showing you you've tried to use a string as a number.

STR\$ not only works on numbers. It will work on numeric variables and expressions as well. Hence:

```
number=24
number$=STR$(number)
```

puts 24 into the string variable *number\$* while:

```
result$=STR$(72/12)
PRINT result$
```

shows that the string variable *result\$* holds the character for 6. Notice that in this last case

counts the negative sign and the decimal point along with the figures as characters. And if you've followed all that, try explaining the result of:

```
PRINT LEN(abc)
```

The more thoughtful, or perhaps cynical, reader may be wondering what the point of all this is. After all, you can put a number into a string without

```
10 REM PROGRAM 1
20 INPUT "House number",
   number$
30 INPUT "Street name",
   street$
40 address=number$+CHR$(
   32)+street$
50 PRINT "The address is
   "address"
```

Program 1


```

10 REM PROGRAM II
20 INPUT "House number",
number
30 INPUT "Street name",
street$
40 FOR loop=number TO nu
mber+50 STEP 2
50 address$=STR$(loop)+CH
R$(32)+street$
60 PRINT "The address is
address$
70 NEXT loop

```

Program II

values that loop control variable takes.

Try changing all the *numbers* to *number\$* and see what happens. The program crashes because you've tried to do calculations on a string. Never mind that the string may contain a number. You can't use it as a number, only as a string.

Line 50 has us using STR\$ for the first time in a program. Here is takes the value of *loop* (increasing by 2 each time round the loop) and turns it into a string. This is then promptly joined with a space and *street\$* as before and stored in *address\$*. Line 60 prints out the information stored in *address\$*.

Of course it's not a very practical program, but it does have potential. It should only take a little imagination to see how it could be used as the basis of a larger program which kept track of, say, a paper route.

Instead of displaying all the addresses on screen they could be printed out or, better, saved to tape or disc for further use. Notebook in the September issue of *Electron User* shows an easy way of doing this.

Before we leave Program II I'd like to make two points about it. The first is that, unlike Program I, the street number is kept in a numeric variable *number* and not a string variable, *number\$*.

While it doesn't make too much difference in this case, I much prefer Program II's way of arranging the variables. After all, you expect a number

in a numeric variable, while a string might contain all sorts of characters.

This may not be a problem in the above example but in long, complicated programs keeping numbers in numeric variables and non-numerics in string variables can save some elementary but time-consuming errors.

The second point is that after what I've just said about keeping them separate, I've used STR\$ to make *number* into a string. This may seem a bit contradictory but it's not, honestly. While I advocate keeping numbers as numerics and non-numerics as strings when you're using them, I don't object to numbers being turned into strings so they can be stored more efficiently.

In Program II *address\$* manages to hold the information from two variables (*number*, *street\$*) in one variable. This can be quite a saving, as Program III shows:

```

10 REM PROGRAM III
20 DIM name$(3), age(3), w
age(3)
30 FOR loop=1 TO 3
40 INPUT "Name" name$(lo
op)
50 INPUT "Age" age(loop)
60 wage(loop)=age(loop)*
1000
70 NEXT loop
80 FOR loop=1 TO 3
90 PRINT name$(loop);age
(loop);wage(loop)
100 NEXT loop

```

Program III

This gem of the programmer's art calculates the wages for three employees using a rather strange formula. The pay is £1,000 for each year of age. No doubt in this concern they expect the work to kill you off young!

You should have no difficulty following how it works. Line 20 dimensions three arrays. The string array *name\$(i)* holds the employees' names while *age(i)* and *wage(i)* are self explanatory.

The FOR ... NEXT loop cycles three times, each time

asking for an employee name and age. For each cycle line 60 calculates the wage and stores it in the appropriate element of *wage(i)*.

The second FOR ... NEXT loop just prints out the name, age and wage for each of the three employees. As it is, they're all joined together. You might want to add spaces to make it a bit more intelligible.

For the moment, however, we're only interested in creating a compact record, not making it pretty.

But if you have difficulty finding the "joins" between the parts of the record you might wonder how you could get a computer to find them.

As you'll have seen if you've run it — and if you haven't you should have — the program works. But, having said that, it's all you can say about it.

Does it really need three separate arrays to keep track of things?

Line 90 is just printing out a simple message but it has to search through all three arrays to find the data it wants. Program IV does the same job, but does it in a different way:

```

10 REM PROGRAM IV
20 DIM record$(3)
30 FOR loop=1 TO 3
40 INPUT "Name" name$
50 INPUT "Age" age
60 wage=age*1000
70 record$(loop)=name$+S
TR$(age)+STR$(wage)
80 NEXT loop
90 FOR loop=1 TO 3
100 PRINT record$(loop)
110 NEXT loop

```

Program IV

This program only uses one array, *record\$*, to keep track of all the information. Each time round the FOR ... NEXT loop lines 40 and 50 use INPUT to store the employee data in *name\$* and *age*. The next line calculates the pay as before, recording it in *wage*. Line 70 is the one that makes the difference.

Here STR\$ is used to turn the numeric variables *age* and

wage into string variables. These are immediately concatenated with *name\$* and the whole lot is stored in the relevant element of *record\$(i)*. Now all the second FOR ... NEXT loop has to do is to print out three elements of an array instead of the previous nine.

You'll notice that, again, the parts of the record, the name, age and wage, all follow one from another without a gap. It's difficult to see where the age ends and the wage begins. The fields of the records, as they are known, are joined at the ends.

Again, a few spaces might make things more intelligible. We'll be dealing with these fields when we come to using the LEFT\$, RIGHT\$ and MID\$ functions.

While Program IV is arguably more efficient than Program III, it doesn't have its flexibility. With Program III it would be easy to print out the employee data in the order age, name, wage if we wanted it that way. We'd just change the order of the arrays in line 90, leaving the main structure of the program intact.

With Program IV, however, we'd have to change line 70, altering the way the data is stored in *record\$(i)*. This problem can be eased using some of the string-handling techniques we haven't covered yet, but even so the changes aren't that simple.

So while the program may be efficient, it's not so flexible.

You'll find as your programming experience grows that this trade off between flexibility and efficiency becomes a regular headache. It's up to each programmer to choose, though as computers get faster and memories larger and cheaper, I suspect flexibility will become prized over efficiency.

For the time being, however, just notice how STR\$ has been used to turn numbers into strings and store them in another string. Later on we'll learn how to search these data strings for their information.

For the moment have a look

Beginners

From Page 37

over Program V, a yet more efficient version of Programs III and IV.

The program is shorter and uses fewer variables. As you can see, there's no variable *name*, the appropriate element of *record\$(i)* is used instead. Similarly, rather than have a separate line and variable for calculating and storing the wage, *STR\$* is used with the expression *age*1000* in line 60.

While this may be a more efficient program, I don't like it all that much. Not only has it lost its flexibility, it's also a lot harder to understand. Dropping the variables *name\$* and *wage* tends to hide where things are happening.

When I come back to look at the program in a month's time how long will it take me

numbers? It's a good question.

Of course, the ASC function we covered last month could be said to convert a string to a number, but that's not what we want. While:

```
PRINT ASC("A")
```

may give 65, so does:

```
PRINT ASC("AB")
```

and:

```
PRINT ASC("ABC")
```

Similarly,

```
PRINT ASC("1")
```

gives the same result as:

```
PRINT ASC("12")
```

which is hardly going to be much use extracting numbers from where we've stored them in strings. What we want is the aptly named VAL function. This turns the numeric part of a string back into a number again so:

```
PRINT VAL("12")
```

gives 12 and, to show that we really have transformed it into a number and that you can do maths with it,

```
PRINT VAL("12")+12
```

gives 144.

For VAL to work on a string, that string has to begin with a plus or minus sign or a number. If it begins with anything else, you get a 0 for your trouble. So:

```
PRINT VAL ("-56.67")
```

gives -56.67 while:

```
ages="+7"
age=VAL(ages)
PRINT age
```

gives 7. Incidentally, this last example shows that VAL can work on a string variable.

Beware, however, strings that contain expressions, as VAL only works on the first number. Hence:

```
sum="25+15"
PRINT VAL(sum)
```

only gives 25 as the answer. And remember that it must start with a number or plus or

minus sign. Try:

```
strings="+123"
returned=VAL(strings)
PRINT returned
```

and you'll get 0 returned. Similarly:

```
PRINT VAL("BODGER")
```

gives 0 as it starts with a letter. Notice the difference between:

```
PRINT VAL("PETE34")
```

and:

```
PRINT VAL("34PETE")
```

The first returns 0 as the string starts with a letter, while the second returns 34. VAL takes all the numbers it can and then ignores the rest.

Which leads us nicely to Program VI which does the wonderful trick of finding the combined age of myself and my two moggies.

```
10 REM PROGRAM VI
20 DIM record$(3)
30 REM setting up data array
40 FOR loop=1 TO 3
50 READ record$(loop)
60 NEXT loop
70 age=0
80 REM extracting and using data from records
90 FOR loop=1 TO 3
100 age=age+VAL(record$(loop))
110 NEXT loop
120 PRINT "Our combined ages amount to "age
130 REM data held in age+name form
140 DATA 3BODGER
150 DATA 2SPOT
160 DATA 34PETE
```

Program VI

This uses VAL to extract numeric information from a string. If that sounds a bit formal, don't worry, it's quite simple in practice.

Lines 140 to 160 hold the information to be processed, in this case the names and ages of my two cats and myself. Bodger is three years old, Spot is two and I'm an amazingly virile and youthful 34.

The first FOR...NEXT loop

reads these values into the three elements of the string array *record\$(i)*. *record\$(1)* holds 3BODGER, *record\$(2)* 2SPOT and you can guess what *record\$(3)* holds.

Notice that the information is held in the strings in the same concatenated format we produced in Programs IV and V. Now, however, we're interested in getting the numeric bits out of the string instead of putting them in one.

Line 70 initialises the string variable *age*, setting it to 0. The following FOR loop does the work of the program. Each time round the loop it takes a record, using VAL to take the numeric part of the record (the age) from the rest of the string (the name).

If you can't see how that happens try:

```
PRINT VAL("3BODGER")
```

and you'll see how you only get the number returned. As the age is taken from each record in turn, the running total is kept in *age*. Finally line 120 prints out the result.

And that's one way of using VAL to extract information from strings. What do you think of the program from the point of view of flexibility, clarity and efficiency? Can you alter it so that you find our average ages? And could you expand it to store and retrieve information about our weights and eye colours? It's a problem isn't it?

That's all we're going to cover this time. We've seen how to use STR\$ to convert numbers into strings and VAL to do the reverse. We've also come across an extremely compact way of storing information, one which we'll be dealing with a lot more.

See if you can use what we've covered in the past couple of months to create your own program to store and display information. And, if you've got any time left after that, can you mugtrap the above programs and maybe make Program V even more efficient (and less comprehensible)?

● *That should keep you busy until next time, when we deal with STRINGS and string slicing.*

```
10 REM PROGRAM V
20 DIM record$(3)
30 FOR loop=1 TO 3
40 INPUT "Name: " record$(loop)
50 INPUT "Age: " age
60 record$(loop)=record$(loop)+STR$(age)+STR$(age*1000)
70 NEXT loop
80 FOR loop=1 TO 3
90 PRINT record$(loop)
100 NEXT loop
```

Program V

to find where the wages are calculated? And if I start messing around with the program, will I realise that the *record\$(i)* of line 40 contains a completely different set of information from the *record\$(i)* of line 60?

I think of the three I prefer IV. It does the job and as far as I'm concerned, it does it at an acceptable level of efficiency, flexibility and comprehensibility.

Also, its method of storing numbers in strings brings us onto the next topic!

So far we've been busy converting numbers into strings using STR\$. Is there a way for converting strings, or parts of them, back into

Software Surgery

THE COLUMN THAT TAKES A LOOK INSIDE THE LATEST RELEASES

The Joffe Plan
Mirrorsoft
and
Watch Your Weight
Acornsoft

WHEN the Editor sent me these two packages, I thought he was trying to tell me something. Well, I've news for him - it's not me that's overweight!

These two programs contrast greatly in their approach to the problems of weight-control.

Acornsoft's Watch Your Weight is based upon creating a strict diet by accurately measuring calorie intake.

The Joffe Plan, in contrast, emphasises the importance of exercise and changes to diet.

Both pieces of software are well-constructed packages, accompanied by comprehensive manuals.

Watch Your Weight begins by presenting a graphical display of your weight and height that shows whether you are obese, very overweight, overweight, desirable or below desirable.

The same graph is used for men as women.

Although a woman is likely to have a lighter body frame than a man, it is natural for her to have more body-fat without increasing the risk of weight-related diseases.

This part of the program is not designed for youngsters under the age of sixteen.

Some people may find themselves below the desirable weight range. The package gives useful advice even to the extent of helping you to put on weight.

For those within the desirable range, physical effort rather than calorie control is recommended, though no details of suitable exercises are discussed in this program.

Those people that fall into the very-overweight and obese ranges are advised not to use the program but to consult their own doctor.

Once the program has

helped you decide whether you need to lose weight, and if so how much, it then helps you calculate the number of calories you should have each day.

The computer estimates this from your weight, age and sex and the degree of physical activity in your life.

The program then asks you if you want to start a diet.

Once you know roughly how many calories you need daily, it can estimate how long you will have to diet to lose the required amount.

If you cut your estimated daily requirement down by 1000 calories a day for a week you should lose about two pounds of body-fat. That's about the optimum weight-

loss for good dieting.

You've a choice in how quickly you want to lose weight, but the program is structured so a dangerous diet is not recommended.

It's at this stage that a recording of all your personal details and proposed diet is made on a blank cassette.

You need to load this data back into the computer each time you monitor your changes in weight.

It is characteristic of both packages that a cassette is used to keep a record of your details and progress.

The manuals associated with each package also give a lot of very useful advice on diet and the best types of food to eat.

If you've got a weighty problem on your mind...



A major aspect of the Acorn program is the Calorie Calculator. This makes it easier for you to count calories, fibre and fat.

Not only will it tell you what a certain food contains, but it also calculates a running total of everything you eat.

This helps you work out exactly how much you've consumed during the day, and tells you how many calories you have left.

The program contains a large database of foods called up as you enter your daily diet. At first you have to weigh exactly everything that you eat, but we are assured that with practice it is possible to guess the approximate amount, the computer automatically calculates the number of calories and then totals the values.

The computer also says whether you are eating too much fat or not enough fibre.

Another section of the program helps you to devise meals to meet your dietary needs.

For example, if you have only 400 calories left to eat but you are low on fibre, you can look up 400 calorie meals and select one with a relatively high fibre content.

The Monitoring Your Diet section uses the cassette recorded previously to show you how much progress you're making.

It updates the details and enables you to make a new copy. It's suggested that this is not done more frequently than

Professor Justin M. Joffe

THE JOFFE PLAN



From Page 39

once a week.

The micro draws a graph to show your starting weight, your expected weight loss each week and the predicted duration of the diet to reach your goal weight.

The graph also shows how well you are doing.

If you're successful in achieving your target the manual gives you advice on maintaining that weight-loss.

On the other hand, if you fail to lose weight then it is suggested that you take the User Guide and a record of your last data cassette to your doctor.

I cannot imagine the reaction of my doctor as I present him with my computer and data cassette. . .

We'll now turn to the Joffe Plan.

Program One has two parts that are designed to set up your personal Weight Control Plan.

The first major input relates to your desires - how much weight you want to lose and how quickly you want to lose it.

The program won't allow you to enter figures that could be dangerous to your health, not will it create a plan that would take more than six months to complete. You'll be asked to set a new and easier goal.

The second part of the program contains a series of brief questionnaires which inquire upon your personal eating habits. Nearly all the questions are multiple choice.

The answers to the questionnaire are used by the micro to generate a set of penalties. These penalties are imposed upon you if you're not reaching the targets you've set yourself in the first section.

The questions include:
Do you have a breakfast every day?

Do you eat with other people?

Do you work while eating your lunch?

Do you eat sitting down?

The computer then responds with two recommendations. Mine were:

Eat a proper breakfast and Stop work for lunch

Try telling my boss that. . .

The Electron then goes on to question your more personal habits:

Do you take larger-than-

average helpings?

Do you eat the leftovers?

Do you eat faster than most people?

From these the micro makes a list of changes and asks which you would be prepared to carry out.

Finally the questionnaire deals with your relationship with the fattening foods. It asks you to identify those that you treasure the most.

With all the information gathered together, the program makes three proposals.

The first is that you should take some mild but specific action towards losing weight. It then puts forward some Amber Zone penalties. If you begin to fall behind in progress then you will be asked to carry them out.

These are your amber zone penalties:

1. Swallow your food completely before preparing to take another mouthful
2. Always sip off fat from meat
3. No fizzy drinks (or low-calorie)
4. No snacking or crumpets, pastries, biscuits or biscuits
5. Eat only 3 slices of bread (except at breakfast) and no more than 1 potato per portion of rice per day
6. Have only half the amount of LINDIE Cakes you usually have

If you fall further behind and enter the Red Zone, then further penalties are enforced.

These are your red zone penalties:

1. Take average size portions or less
2. Always leave some food uneaten on the plate
3. No chocolate or sweets, portions of cake or home, ice creams, portions of fruit etc, canned fruit
4. No alcohol
5. No LINDIE Cakes

In order to avoid these penalties it's possible to earn credits through taking extra physical activity.

The basis of the Joffe Plan is to reduce your weight and increase your fitness by moderately changing your exercise and eating habits.

Your individual plan is

based upon what you eat now and how much you exercise now.

It doesn't presume you have a degree of fitness already, nor does it prevent a very fit person following the plan.

You may be an over-eater or an under-eater. The program sets goals that are relevant to your individual situation.

The information the micro gains and the targets it has set you are then stored on a blank data cassette. Once this has been made, Program One, is not used again - unless you wish to set up a new weight-control course.

Program Two checks your progress. It begins with a short menu.

- Report in.
- Check progress.
- Check fitness.
- End program.

By choosing Option 1, you automatically check your progress and fitness.

After entering your present weight, the micro asks you to take the fitness test.

You measure your pulse rate using the computer and carry out some physical exercise that makes you out of breath.

Once breathing hard, you sit quietly in front of the computer for two minutes before taking your pulse again.

The difference in the two readings is a measure of your fitness.

Another program is now loaded.

It displays a graph of your progress, reminds you of the steps you are taking to lose weight, tells you how many days you have left to reach your target, and gives other useful advice.

You are given an oppor-

tunity to tell the computer if you have done any extra exercise.

This in turn will give you credits which are used to offset any penalties you have received because you're not losing weight fast enough.

Finally a new copy of your data cassette is made.

In comparing the two programs there are three major observations I think are important.

Firstly, the Acorn program is recommended for use once a week and no more frequently. The Joffe Plan is best used every day or every other day.

Secondly, the Acorn system is contained within a single program. The Joffe Plan has many programs that need to be loaded. Within Program Two a second file has to be loaded for Option 2.

Finally, the Acorn system considers only diet. It treats food in a very clinical manner, counting every calorie, balancing numbers and using weight-loss as the only measure of success.

The Joffe Plan uses your fitness as well as your weight as an indication of progress. It's not necessary to strictly measure the quantities of food you eat. You simply remember a few limitations that the micro imposes upon your eating habits.

I personally prefer the Joffe Plan, but my wife is in favour of the Acorn program.

Both are worthwhile packages - it's a matter of personal choice which you buy.

Certainly, I wouldn't lose weight worrying about it. . .

John Woolford

Sexist teaching

Read Right Away
Reading Pack 3
Reading Pack 4
Highlight Software

Read Right Away is a series of four packs each containing two programs designed to give children practice in reading. Here I'll be reviewing the packs for older children.

Pack 3, aimed at ages 7-10.

contains two programs, Magic E and Break-in.

The two programs in Pack 4, Sortout and Letterbugs, are aimed at 8-11-year-olds.

The teaching is based upon the phonics approach of sounding out individual letters to make a complete word.

The first pack I tried had an exercise with magic e's, that trailing vowel that changes the vowel sounds of bit into bite and hat into hate.

The object of the game is to rescue a damsel from the top of a tower by building a ladder of four of these magic e words.

The program contains a vocabulary of over a hundred, divided into 15 groups.

The random selection guaranteed that repetition was not a real problem.

The sexist nature of the presentation appals me and is quite unnecessary. The teaching of reading does not have to portray the inequalities of sexual stereotypes.

Break-in, on the other hand, makes a mockery of the police. If the child succeeds in helping them capture the four burglars, the policemen dance up and down the screen,...

The educational principle is sound. The child has to discriminate between the soft and hard g and c sounds.

This program, like the others, requires the use of the Return and cursor keys.

However, there's been no attempt to protect the Break key. Touching it causes the program to be totally lost, not even QLD and RUN will rescue it.

This is very poor as the program is designed for use by young children.

The fourth pack in the series follows the same format as the others.

The two programs are contained on both sides of a cassette.

The box, although of a high professional standard, contains only the minimum of details.

There is no information about the number, variety and selection of words within the programs.

However, the screen displays are of the same bold, clear and interesting format. Sound is used throughout to stimulate and help the user of the program.

Sortout is an exercise in

putting letters and words into alphabetical sequence. The child has to control a lift using the up and down cursor keys.

There are three types of problems and two levels of difficulty.

As with the other games, up to four children can play in competition with each other. However, all players must be at the same level - it's not possible for an older child to play with a younger in fair competition.

I found the Letterbug program most frustrating.

Seven words on a particular theme are represented as blocks - one for each letter. The child has to guess at the letters.

I found that when more than one player was using the program attempts to complete words low down on the screen wiped out the words above.

This made it nearly impossible to complete the exercise.

I had to introduce the rule that each word had to be tried in turn starting at the top. It's obvious that such a restriction was not intended by the designers of the package.

Delving into the program itself, I discovered the extent of its vocabulary.

There are 14 sets of words with between eight and 11 words in each set. The topics include trees, boys names, metals, pets, insects, countries and planets.

The variety and grouping of words is rather restricted. It would have been an advantage if phonically related words had been grouped together.

There is no facility for new sets of words to be added to the program.

Computers have a lot to offer the teachers of reading. It would also play an important role in the home.

This program has some serious drawbacks that professionally-produced, teacher-inspired programs should not have.

However, it's better than nothing. If the program creates a situation where parent and child work together in reading, where the child can show off his or her ability and where reading can be fun, then that must be a good thing.

Despite my reservations, I'll use these programs with my kids.

John Woollard

Good spot to start adventuring

Firienwood
MP Software

FIRIENWOOD is a 100 per cent machine-code adventure which makes up in presentation and speed what it lacks in difficulty.

An evil wizard has stolen the fabled Golden Bird of Paradise.

Your task is to search Firienwood in order to find and enter the wizard's castle.

If you can then overcome the wizard and free the golden bird, you will receive untold riches and happiness for the rest of your life, plus an invitation to play the adventure again.

The game seems to concentrate more on difficulties than problems.

For instance, you have to cross a river, but the boat you wish to use will only hold you and a certain number of objects. There are more objects than you can take with you, so what do you take?

M & P tell me there are a few ways of solving the game. I only used one—but, from the number of locations and puzzles that seemed to have

no bearing on my solution to the adventure, I think they must be right.

The vocabulary is fairly extensive and most of the GET, DROP, and EXAMINE type of verbs are recognised as well as a few you wouldn't expect.

The only drawback to this adventure is the market it seems to be aiming at.

I can't see an experienced adventurer taking more than a couple of hours to solve the game—and surely there aren't that many novice adventurers.

However, if you are a novice—better yet, if you have never tried an adventure before and are wondering where to start—then this is the adventure for you.

It is free from the spelling mistakes that sometimes plague even the more up-market games.

Also the on-screen display is not off-putting, which novices sometimes find to be the case with the normal black-and-white display that we purists prefer.

Overall, definitely for the beginner, but should not be completely dismissed by the more experienced player.

Merlin

With a View to meatier output

View
Acomsoft

If you spend a lot of time at a typewriter, and if your typing is anything like mine, you'd be better off with a word processor.

Basically this enables you to type your letter or document directly into your Electron.

The text can be altered, corrected and manipulated very easily and then, when it's finished, it can be printed out.

Acomsoft converted the BBC's word processor, View, for the Electron to take

advantage of the Plus 1.

It's a ROM cartridge which means that all of the Electron's RAM is available for storing the text.

View is selected in preference to Basic on power up or after a hard Break. A * command such as *BASIC can be used to leave View. Peculiarly, though, *WORD is used to select View.

Initially you are in command mode and there are 25 commands available. NEW, LOAD, SAVE and MODE are fairly obvious. LOAD won't

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work with cassette, however – you have to READ it in instead.

Other straightforward commands are PRINT which prints the text using the printer, SCREEN which prints the text on the screen, and COUNT counts the number of words.

The maximum amount of RAM available for text is about 16K if you have a Plus 3 disc drive and about 20K with tape or a Cumana system. This is in Mode 6.

If you like working in Mode 0 though, there can be as little as 4k of memory left to hold your masterpiece.

The amount of memory free isn't really a problem.

Files that are too large to fit in the memory can easily be worked on using the EDIT command. This reads in a more manageable chunk of the text.

When you've finished editing the section, typing MORE will save it and load in the next chunk of text. When you have completely finished, just type FINISH. It's really quite simple.

Escape toggles between text mode and command mode.

On entering text mode you find yourself faced with a rather bewildering array of commands. There are 44 immediate commands and 23 other commands that can be stored in the text.

Virtually every key on the keyboard does something. At

first I was afraid to touch the keyboard for fear of destroying any text I had typed in.

Even after using it for several months I still have to consult the function key strip supplied with View.

One of the advantages of View over some other word processors is that what appears on the screen is what appears on the paper.

It's very easy to lay out the text exactly how you want it to be printed and see what it looks like.

Another plus is that the text stays where it is – whenever possible – and it's the cursor that moves.

This is more natural than having the cursor fixed on a line and the text constantly scrolling up and down, as with some word processors.

View works in any mode and as printers generally print in 80 columns it's convenient to work in Mode 3 if you have a monitor.

Any string of characters can be CHANGED to any other string of characters or searched for. Non printable characters and wild cards can be included.

Any string of characters can also be selectively REPLACED by any other string.

Either Y or N must be pressed to indicate whether each match found is to be replaced or not.

All the stored commands affect the way text is printed out.

The text can be placed

anywhere on the page. Left and right margins can be set and headers and footers defined. The two letter commands to do this are placed in the margin – they won't be printed out of course.

The immediate commands act, as the name suggests, immediately on the text. They are accessed by holding the Caps Lk/Func key down and pressing one of the other keys.

The cursor can be moved anywhere on the screen and the text scrolled forwards and backwards using the cursor keys.

Characters can be deleted forwards and backwards and text can be entered in insert or overwrite mode.

In insert mode, the text is pushed along and the text inserted. In overwrite mode, text is written over what is currently at the cursor.

Blank lines can be inserted and lines can be deleted with a single keypress. Lines can also be split to form new paragraphs and concatenated to join them again.

There are several commands which act on a block.

To define a section of text as a block, markers are placed at the start and end.

The block can then be deleted, moved to a different part of the text, copied, formatted, saved, counted, searched, changed and loaded.

View has a macro facility. This means that any section of text can be given a two-letter

name.

Whenever this text is needed, there's no need to type it in – just enter the name in the margin instead. This is very useful for standard letters which may have the same address and text.

My only criticisms are that it is sometimes slow in Modes 0 to 3. This isn't serious, though, and is partly the Electron's fault anyway.

What is serious is the total lack of any means of inserting printer control codes.

The printer must be set up before entering View. If you've entered View and loaded your text file, then there isn't any way of altering the printer settings.

It is often necessary to swap between the different styles of print within a document. The title may be in bold, the points needing emphasising in italics, and other important bits may need underlining. This is impossible with View.

There is a printer driver program available, though, but you shouldn't need a program to patch up what should have been included anyway.

Apart from these grumbles, I like View.

It's easy to use, very powerful and flexible.

For a straight printout it is excellent, but if you need to swap print styles within the text it isn't so good.

It's probably my most used ROM. Recommended.

Roland Waddilove

On the fringes of artificial intelligence

**Talkback
(Electron)
Acornsoft**

SOME while ago, when computers were things owned by rather strange people with more money than sense, I went to see a program called Eliza.

It was almost the first program I can remember seeing, and it made a great impression on me.

It seemed that the computer could be spoken to through the keyboard, and that it actually answered back in an intelligent manner.

Such programs are old hat

now, but this cassette might be interesting for those keen on Artificial Intelligence, for it gives a marvellous insight into the way such a program is written.

The main menu allows several options, one of which is to load a character from tape.

Two are provided, Astro and Bomb, and fans of the film and book Dark Star will have the opportunity to convince the bomb to return to the docking bay...

The accompanying booklet gives quite detailed instructions on how to decide the characteristics of other people,

through the examples of Helen and Ron.

Creating or altering a character is fairly straightforward once a little familiarity is gained.

Keywords – including short phrases – and responses can be entered or altered, so that fairly predictable conversations can be held, either between the two selected characters, or between the user and one of these.

The same keyword could provoke differing responses, but there is a priority system which decides which response should occur.

Actually, I found the con-

versations themselves to be rather repetitive and bland, and I was much more interested in designing characters.

However, the booklet does include a rather amusing list of possible conversations, such as the one between a marriage guidance counsellor and King Henry VIII.

The average Electron owner will probably get fed up with the possibilities fairly quickly, but those with a particular interest in this area will find it most worthwhile.

I can also see some value in computer studies lessons in schools.

Phil Tayler

**ROLAND
WADDILOVE**
continues our series
designed to help
you make the most
of the Electron's
disc filing systems



IF you have a Plus 3 disc filing system, or you're thinking of buying one, then read on. In this short series we're going to see how the Plus 3's advanced features can be used to the full.

Disc filing systems are completely different to the ordinary cassette filing system, and the Electron's ADFS - Advanced Disc Filing System - is even substantially different to the BBC Micro's older DFS, so there are lots of new commands that we need to get to grips with.

The manual supplied describes all the additional commands, plus a little technical information detailing how they actually work, but newcomers may find it a bit hard to digest.

I hope to expand on the information provided and include several short examples to demonstrate the new facilities.

First a warning. When trying out any new disc commands or programs that alter the disc in any way

Browsing through the DFS libraries

always use either a blank disc or one which has nothing valuable on it. You may find yourself accidentally destroying the contents, so watch out.

I'm assuming that you know the basics - and Basic - and that you can format a disc and load and save programs. Pete Bibby's excellent beginners articles will help if you're unsure.

First we'll look at directories. A directory contains a list of the files on the disc, a file being simply something that you have saved, usually a program.

*CAT will print three lines of information followed by the names of all the files in the directory.

Looking down the left hand side, the first line shows the

title, which we will come to later, the next shows the drive, and the third the directory name. See Figure 1.

Think of it as being like a telephone directory. This contains a list of names and addresses of people who live in a certain area who have telephones.

There are many different telephone directories, each covering a small area, each with its own list of names. In a similar way it's possible to have many different directories on a disc, each with its own list of names of programs or files.

When a disc is formatted a single directory is set up. This is the root directory, \$, The names and addresses of any files saved are placed in here.

If we want another directory then it can be created using *CDIR.

*CDIR Games

would create a new directory called *games* and its name is placed in the \$ directory.

Try creating a games directory, then type *CAT. After every filename are up to three letters and a number in brackets. If one of the letters is a D then the file is a directory.

The root directory \$ now contains another directory *Games*. The currently selected directory, which from now on I'll call the CSD, is \$, shown on the third line down after *CAT.

All programs saved are placed in the CSD, and programs can only be loaded from the CSD - that's not quite true, but it will do for now.

We can easily select our new directory with *DIR *Games*. Type:

```
*DIR Games
*CAT
```

and you will see the title *Games*, the drive and the directory, *Games*.

Games is now the CSD, and all commands apply to this directory. So if you save a program its name is placed here. When loading a program or file this directory will be searched. If it's not here you can't load it.

*BACK enables you to move back to the previously selected directory. Before, \$ was the CSD, so *BACK would make \$ the CSD. *DIR without a name selects the root directory \$.

Games could be thought of

>*CAT			
Games Programs			
Drive: 0			
Dir. Games-1			
		(14)	
		Option 03 (Exec)	
		Lib. Library	
AtomSmash	WR (01)	Digger	WR (09)
Jambutti	WR (12)	jamcode	WR (03)
Mazebugs	WR (10)	Mr_Freeze	WR (05)
PicSlide	WR (08)	SBattle	WR (07)
Skramble	WR (14)		

Figure 1: Disc directory

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as a child of the directory \$, and \$ the parent of Games. The special character ~ means the parent of the CSD. If the CSD is Games then ~ would be \$, and:

***DIR ***

would select the parent of Games, \$.

As you can see, one directory such as \$ can contain another directory, Games. This could contain a further directory, and so on.

To load a program called Kingdom you may have to go to the \$ directory, then to Games, then Adventure to finally load Kingdom as you can only load a program from the CSD.

As I mentioned before, this isn't quite true and there's a way round the problem. We could say:

LOAD *\$.Games.Adventure.Kingdom

This means get Kingdom from the Adventure directory,

which is in the Games directory, which can be found in the root directory, \$. It will do this without leaving the CSD, whatever it is. This is possible because you have told it the path to take in the name you gave.

Hence \$.Games.Adventure.Kingdom is known as a pathname.

As well as the currently selected directory, the ADFS also keeps track of one other directory. This is called the library just to confuse you! It's printed on the same line as the directory after *CAT.

This directory may be used when you *RUN a machine code program. If you enter:

***RUN Program**

or

*** / Program**

or

***Program**

which are all equivalent, then first the CSD is searched for the program. If it finds it then it's loaded and run.

But if it can't be found then

the directory which is the currently selected library - which I'll call the CSL - is searched.

If it finds it, it's loaded and run as before, if not an error message is printed.

Thus it is possible to keep all your utilities in one directory, such as the one actually called Library on the welcome disc.

By setting the CLS to your utilities directory all the utilities are available using a simple *command, and there's no need to search the directories looking for them.

To set the library to a particular directory you use *LIB, so:

***LIB Toolkit**

would make the CSL Toolkit, providing it's in the CSD.

As you know, *CAT prints a list of all the files in the CSD, and that to find out what is in another directory we can select it with *DIR name, then *CAT it.

There is an alternative, though. If one of the CSD's files is a directory itself then

we can type:

***CAT name**

and the files in directory name will be listed. Before, we created the directory Games which was in the \$ directory. If the CSD is \$ then we can list the files in Games with:

***CAT Games**

It is possible to use pathnames to display a directory's contents. For instance:

***CAT \$.Games.Adventure**

would list the files in the directory Adventure which can be found in the directory Games which is in the \$ directory.

There is also a command to list the contents of the CSL. *LCAT. If the CSL is Library then *LCAT would print the contents of Library. In this case it would be equivalent to *CAT \$.Library.

So, as we have seen, libraries and directories aren't half as complicated as they sound.

Practice creating libraries and directories and moving between them loading and saving files. It's good fun!

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I'VE had a plea from D. Wynne about *SIM* from Viper Software. He can't get anywhere and offers me a fiver if I can solve it. This is one program I must get a look at!

Carl Marlow has written in asking about *Fighter Pilot* from Kansas. Apparently he can't pull out of a dive when attacking enemy aircraft.

I'd like to help but unfortunately Kansas won't let me have any programs to review. If any reader can help Carl then please let me know.

Many thanks to Jonathan Ewing (J.R.I.) for sending in a complete solution to *Stranded* and to Chris Wray and his brothers — how many of you are there? — for the solution to *Gisbourne's Castle*.

Nell Sedgewick wants to know if I am any relation to a certain Alice. Who? No, she's a lot cleverer than me.

M.C. Rocca — what is your first name? — has written in with marks for *Ten Little Indians*. I didn't know this was available for the Electron.

Ben Twaddell has sent marks for *Philosophers Quest* and *Hitchiker*. Do these run on the Electron unaltered or have you been clever?

Stephen Waterworth has written in to say that Bug-Byte's *Dragonquest* will run on the Electron.

If any reader knows of any BBC Micro adventures that will run on the Electron will they let me know so that I can make up a list to be published in a future column?

Stephen Waterworth, Tim Cook and Jason Hewitt have all written in asking how to get into the pyramid in *Pyramid of Doom*.

Early versions of this game had a bug in that prevented you from getting into the pyramid. If you can't get the



Problems, problems, always problems

rock and unlock the tiny door then enter the pyramid, then contact Adventure International on 021-643 5102, who will be only too happy to arrange a replacement.

Eve Thompson, to whom I'm very grateful for all the maps and solutions she has sent in, is having problems with *Kingdom of Klein*.

She has searched in every direction in the moebius ravine but cannot find the last solid. Does anybody know where it is?

M. Tiplady has solved most of the *Sorcerer of Claymorgue Castle* but has the following questions:

How do you store the stars, how do you get rid of the odd feeling, how do you open the loft in the ballroom, how do you open the stone door, how do you get into the dragon's lair and, finally, is there another way to open the oak door?

Can anybody help? Ben Twaddell wants to know how to get over the volcano in *Classic Adventure* and I want to know where the volcano is.

Stuart Nicholls has written in asking what the password is for you to be a wizard in *Adventure*. As far as I can find out, there is no password. I'm not sure if it is a red herring or a feature of the game that wasn't implemented.

Adventure but has also forgotten to put a stamp on the envelope. I don't reply to people who do this!

On the other hand, Mark Hunter has sent in a partial solution to the *Incredible Hulk* and an SAE but hasn't asked any questions! Please write and let me know what your problems are Mark.

Stuart Nicholls wants to know how good *Countdown to Doom*, the Digital Fantasia series and the Epic series are.

Countdown to Doom is on ROM so if you have a Plus 1 then it's a good buy. The Digital Fantasia series are much the same format and content as the Scott Adams adventures and are therefore good buys too.

The Epic adventures are to the Electron what the Level 9 ones are to the BBC Micro. No true adventurer should be without them.

Mrs A.E. Morland and David Woods have some



Stewart Hogg has several questions about Comsoft's *Serpents Lair*. He wants to know if there is a way through the desert and the forest, where to use the canoe and where is the sword and when do you use it.

I haven't got *Serpent's Lair*, but one is on the way for me.

Stephen Martin has written in for help with the *Greedy Dwarf*. Apparently he doesn't make maps. To get out of the muddy maze he needs to learn how to! And drop sausages of course.

Andrew White can't find the antidote to toad poisoning in *Galadriel in Distress*. Does anybody know where it is? Tony Remmer has sent in a solution to *TKV*. He has scored 970 points but has still had the adventure finished message.

Unfortunately Tony, the SAE you sent in was only an AE as you didn't put a stamp on the envelope. Talking of AEs, Kevin Addinall has asked how to kill the rat in



questions about *Crown Jewels* that I cannot answer. Is there a telecomm tower location?

In the chamber of horrors, is there a door east when going north or south? Daniel Beherall can't get into the



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material store or turn on the torch.

Tom Holmes would like to know how to attract the policeman's attention. So would I. Can anybody help?

Tim Hicks can't get the keys in the **Greedy Dwarf** and David Hill wants to know how to kill the spider. I know you need the sword, but do you need the keys to get the sword?

B. Britland can't find Annie Gramm or Rithmatiq in **Pettigrew's Diary** and I haven't even got that far. Can anyone put us out of our misery with a map and a solution?

Several people have written in with solutions to problems sent in the previous months. In particular let me thank all those of you who wrote in with tips and solutions to **Crown Jewels**.

Terry Mealing should look in the Houses of Parliament, Madame Tussauds and Buckingham Palace if he wants some treasure.

John Harnett has also written in to help Terry Mealing and says that he should smash the pillar and the column in **Stolen Lamp** to get the sword and key box.

M.C. Rocca has written in to say that the solutions to H. Bastien's problems are the black hole is a red nering and that to solve the Jovian mine he should examine the alien art gallery and that there is a definite TWIST in the plot.

Phillip Hooper says that Andrew Dickman's problem in **Adventure** is solved by turning off the lamp and hooting, is that some kind of practical joke?

Finally, before going on to some problems that I do have the answers for, let me apologise for the delay in answering some of your letters.

I have been on holiday attending an advanced wizards spelling test.

Paul Dobson, Jonathan Tryer and Gary Procter, who's produced the best maps I have ever seen, are having problems with **Gisbourne's Castle**.

Maide Marion is in the chapel. To get in, try a bit of excavation in the dungeons first.

If you are too big to get

through a small opening then you should make yourself smaller. Try a spot of lubrication on that rusty door.

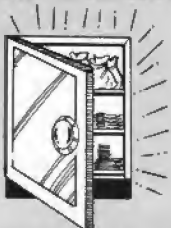
In **Sphinx Adventure** Tim Cook and Paul Donovan are stymied by having their lamp go out. Have you tried polishing it?

Julian D'Alberti and Tom Paterson can't carry everything at once. Find the sphinx and leave some treasures there for safekeeping.

They have also correctly interpreted the clues in the inner sanctum but, once again, need to find the sphinx to put their findings into practice. All of the objects you have found either have a use or are treasures.

Search the desert thoroughly if you want to find the sphinx. Richard Hollis and Ronnie Moore can't open the safe. Use a magic word.

Lewis Smith hasn't yet searched the inner sanctum



thoroughly — use magic. Sean Robinson, David Marlett and Martin Edmondson all want answers about the inner sanctum.

The crown is a treasure and you have to use magic to get out — unless you know differently. Richard Smith also needs magic to get across the glacier.

Mark Popkewicz will find the jack in the rockfall and should polish the ring. Phillip Macdonald keeps getting killed by the dwarf after he has

broken the sword. Did you pick up the axe that the dwarf threw at you when he first appeared?

Phillip Trease and Paul Daly can't get anywhere at all. Use the raised path and then go down. Fill the bottle with water from the lake and douse the flames.

Robert Pawson is stuck in **Valley of the Kings**. Examine a gold statue and you will be able to 'speak your reply'.

M. Hanson keeps getting his throat cut in **Sadim Castle**. Have you got the Bible?

Paul Sexton and V. Wiltson want some problems answered in **Eye of Zoltan**. The password you need in the secret passages is to be found in a cryptogram, and to solve it you should try skipping backwards.

Wear some gloves to get the orb and pay the boatman.

L. Fletcher and David Hill can't decipher the cryptogram in **Countdown to Doom**. Try thinking of it as a 5*5 matrix.

Make sure that your suit is newer than it was and you can navigate around the bottom of the swamp. Protecting your eyes will help with the top.

Alexia Leventis keeps getting killed by the creature in the corridors of doom in **Castle of Riddles**. What colour is that paint that you should have found? If your lamp keeps going out when you enter the fountain of youth, put it out before you go in.

A. Dodds, Neil Jacques and Stephen Arnold all have problems with **Classic Adventure**. To get past the snake, soothe the savage beast and give it the bird.

The vending machine is a red herring. What use is the oil? How do you get through the rusty gate? Think about it.

I don't think the spelunker needs doing anything and there

is no hydraulic jack, so Neptune tells me.

Stephen Gregory wants to know how to kill all the Gremlins when you've got them watching the film. You don't as far as I know.

Neil Macdonald can get out of the ship in **Strange Odyssey** but soon dies from lack of air. Have you got the spacesuit? Yes? Then try opening and closing it.

Stephen Waterworth can't get past the fan in **Spider-man**. Try using something to stop it turning. Want to get to the cloud? Try jumping.

Lewis Smith, R. Henderson and Paul Taylor are having problems with the **Incredible Hulk**. To pull the ring, remember what Dr. Strange told you and don't daydream.

The Hulk has a strong stomach so examine the egg. Yes, the astral projection of Dr. Strange is useful.

Marco Kerr cannot get into the machinery housing in **Wheel of Fortune** to lower the bridge. Keep picking at that lock.

Andrew White wants to know what YABADABODOO does in **Staff of Law**. It's a magic word, so look it up in a suitable tome.

Neil Sedgewick, S. Midgely, T. Holmes, David Woods and Andrew Busby all have questions about **Crown Jewels**. To get some money, clean the toilets and strike a pose. The matches are useful for setting light to things.

The orb is in Madame Tussauds and you'll need to drug somebody to get into the control room at Tower Bridge.

Ben Twaddell wants to know whether you should take everything to the dwarf's hut and where the dwarf is, in the **Greedy Dwarf**. No. I'm amazed that you don't know.

Martin Watson and A. Dodds have some questions about **Quest for the Holy Grail**. The dragon is in need of lubrication. Try putting something valuable in the niche in the huge stone. Don't listen to the maiden. Good advice that!

● If you want Marlin's help write to:
Marlin, Electron User,
Europa House, 68 Chester
Road, Hazel Grove,
Stockport SK7 5NY.

— and enclose an SAE if you would like a reply.

Micro Messages

I AM writing to help Paul Musson with his cube root problem.

I have just completed my maths "O"-level course and am glad that what I have learnt is already coming in useful.

To find the cube root of a number, on the Electron, you must raise the number to the power of a third.

For instance, to print the cube root of 27 you must type:

```
PRINT 27^(1/3)
```

Note that brackets are necessary.

In fact, you can find any type of root of a number by raising it to the reciprocal of the order of the root.

Again as an example, to print the fifth root of, say, 81 you type:

```
PRINT 81^(1/5)
```

— Andrew Simpson,
Clacton-on-Sea.

RE Paul Musson's request for a way to find cube roots.

This can be done by finding the logarithm of the number, dividing by three and then finding the antilog.

A program for this is shown below:

```
10 INPUT "Number ";x
20 y=x
30 z=EXP(LN(x)/y)
40 PRINT "Cube root=";z
50 GOTO 10
```

— Peter Nicholson, New-
castle upon Tyne.

THE answer to the cube root riddle in the August edition is quite simple and doesn't need a mathematical boffin.

Any number (a) raised to the power of the reciprocal of any number (b) gives the (b) root of the number (a), for example:

$4^{\frac{1}{2}} = 2$ that is square root.

$8^{\frac{1}{3}} = 2$ that is cube root.

$16^{\frac{1}{4}} = 2$ that is fourth root.

$32^{\frac{1}{5}} = 2$ that is fifth root.

And so on.

Indeed, why does Basic have square root in its codings?

While writing, I am interested in your articles on machine code and particularly interested in mathematical functions dealt with by machine code.

I have read the manual, and the arrangements to multiply and divide seem quite complicated.

Is it actually faster to use them when solving a formula such as:

Solve f from

$$\frac{1}{f} = -4 \log_{10} \left(\frac{ks}{3.7d} + \frac{1.255}{Re\sqrt{f}} \right)$$

The only way to solve this is in a loop guessing the value of f and then running the loop till one gets close enough — normally seven times round. I have always used the binary search system, April edition.

If it is quicker to use machine code, how do you get a log₁₀ using it?

I hope you will cover this type of problem in your series.

— N. R. Horswood,
Stoneleigh, Surrey.

● Thanks for the cube root help. Maths can be very

difficult in machine code, especially log, sin and cos. The Basic ROM User Guide by Dickens and Holmes might help.

These are just a few of many letters we've received regarding the cube root problem. Correspondence on this subject is now closed.

Keep it clean

RE "Suspect Tapeheads" — August issue. I find your answer to D.L. Cutting suspect.

The fact that he can successfully load back-ups suggests that it is not faulty tape heads.

I think it more likely that the tape itself is either poor quality or possibly unsuitable — that is, 60 min, 90min or 120min audio tape.

Longer tapes tend to stretch and while this has minimal effect in audio work, they can cause problems used with a computer.

However, I must back your

suggestion that tape heads — or equally, disc heads — be cleaned frequently.

After all, we clean our stereo heads every four hours — and a drop out of a fraction of a second on audio may not be heard, but could make a sizeable distortion in a computer signal.

Equally, the record head must be checked periodically for magnetisation.

It is extraordinary how often problems arise in business computers from these reasons. I tremble to think how many more problems must arise in home computers, which are not usually so well maintained.

Yet, cleaning/demagnetisation is very easy and quick. — R. H. Hill, Woodford Green, Essex.

● If your own programs load perfectly but others won't then this suggests that the tape heads are out of alignment, not dirty. If the tape heads are dirty then loading problems will occur with all programs and tapes.

*TV command

COULD you please tell me what *TV is used for?

I have seen it in many programs but do not know what it is used for, or how to use it.

Could you also tell me if anyone has made Magic Mushrooms, Frak or The Hobbit for the Electron? — G.A. Cranch, Hoddesdon, Herts.

● *TV is a command on the BBC Micro which moves the screen up or down. It is ignored by the Electron.

Magic Mushrooms is available for the Electron, the other two games are not.

Protected species

I WAS pleased to read David Molyneux's "Racing tips" in the August edition of Electron User, particularly as I have never progressed past the snow on Overdrive. I was keen to try his tip.

However having done all he suggested, when I tried to load what David calls Part 2, the computer printed "locked" on the screen and the cassette recorder switched off. What, if

anything, can I do?

Why should David have been able to load Parts 1 and 2 and not 1? — Jeff Fraser, Solihull.

● Many readers have asked for pokes, to speed up games, give infinite lives, start on any screen and so on. The problem is that all software is protected and if you don't know how to get round the protection then the pokes aren't much use.

More colours

I READ with interest the review on the Electronic Colouring Book in the December issue.

It says that the Electron supports 35 colours. If you know how to, perhaps you would let me know now to get all these different colours, as I would like to use them in my programs. — **Stephen Wyatt** (age 11), **Norwich**.

● Here's a short program showing how to have 16 colours in Mode 1. They aren't true colours but the effect is quite good.

```
10 REM 16 colours
20 MODE 1
30 VDU 23,255,170,85,170
,85,170,85,170,85
40 FOR I=0 TO 3
50 FOR J=0 TO 3
60 COLOUR I:COLOUR J+128
70 PRINT STRING$(40,CHR$(
(255)))
80 NEXT
90 NEXT
```

Choosing a printer

I HAVE never used a printer before and I find it very difficult to choose one for my Electron.

Could someone please help me make a choice?

I need one for average computer printing and can

afford up to £200. I am looking at the Tatung TP100 presently. — **W.H.R. Lee**, **Wickford, Essex**.

● The best way to choose a printer is to go to a large micro store and ask for a demonstration if possible. Then you can compare the quality of print and see which is most suitable for your needs.

Alternatively, visit your local user group — there's bound to be someone there using an Electron with a printer who can give you advice.

Elite for beginners

HERE are some tips for Elite beginners.

When you have 800 credits, buy an E.C.M. system. You will have 200 credits left over, for purchasing new cargo.

After this, buy a front beam laser. You will get 400 credits back for the pulse laser.

Then get a large cargo bay. This lets you carry 35 tonnes instead of 20 tonnes.

After this, a docking computer and a fuel scoop are ideal.

When you have equipped your ship with everything except Galactic hyperspace, take off, speed up, head upwards in a loop until the planet is in your rear view scanner.

Switch to front view and head onwards until the S on your console disappears. After this, jump onwards until something comes up.

Those golden oldies

To you, Electron User, this poem I write,
I use my Electron from morning to night.
Very happy I am, or so it would seem,
To tune into your magazine,
So new and so clean.

Hot off the presses it comes through my door,
So why, oh why should I want even more?
Whatever happened to Micro Kid, Sounds
Exciting, to name but a few,
Many readers miss them, this I'm sure you knew,
So please do us a favour, replace them from now
And we will gladly once more take the thank-you bow.

P.S. And oh, just in time, I nearly forgot. Please could you publish my address, yes, the lot. In hope some young readers will get in touch to exchange hints and tips... Thank you very much! — **Andrew McIntyre** (15), **1 Seton Court, Tranent, East Lothian, Scotland**.

WHAT would you like to see in future issues of Electron User?

What tips have you picked up that could help other readers?

Now's here is your opportunity to share your experiences.

Remember that these are the pages that you write yourselves. So

tear yourself away from your Electron keyboard and drop us a line. And please, if you want a reply, enclose an SAE. The address is:

**Micro Messages
Electron User
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY.**

If an enemy ship launches an escape capsule, I have found that if you fuel scoop it up, you get one tonne of slaves.

If you do this, or pick up an illegal cargo canister, fly straight back to the space station and sell it. This will not affect your legal status unless you hyperspace and then sell it. — **Commander William Goodden**, **age 11, (Competent), Bath**.

● Thanks for the help, William.

Rombox review

Please could you do a review on the Slogger Rombox, containing how many ROMs and RAMs are available for this system?

Also, could you include the capabilities of the Rombox and what BBC ROMs, RAMs and so on will run on it?

Please say "thank you", to Merlin for his superb help with Twin Kingdom Valley. — **Nick, Upminster, Essex**.

● There was a review of Slogger's Rombox in the August issue of Electron User. Back issues are available.

We'll pass the message on to Merlin.

Saving graces

I GET very annoyed when I type in programs, especially long ones, and then find I can't load them when I have saved the listings.

I have a DR10 Saisho Computer Data Recorder.

When I have finished typing in a program, I type SAVE

"(name)". When I press Return, the message RECORD then Return, appears under it.

Then I start recording, and press Return, again.

The name of the program, and the numbers then appear, and the ">" sign appears when it has finished.

I then try loading the program, on the same volume, but the Electron complains with "Block" and "Data" remarks.

I found these instructions for saving programs in the Electron User Guide.

I have managed to record shorter programs — for example, Cheeser — but not long ones.

Please could you tell me what I should type — if I am doing it wrong — to "save" and "load" listings, and also what volumes I should have? — **Matthew Aldridge, Orpington, Kent**.

● Try cleaning the tape heads first. If this doesn't help, then try adjusting the tone and volume controls, starting at the minimum and working up to the maximum until you find the correct settings.

Baffling ROMs

RE the Brother M1009 printer advertised in your February issue. Can you recommend a handbook to explain how to use it with the Acorn Electron Plus 1 and the View and View Sheet ROMs?

I got the computer, and recently the printer, from W.H. Smith.

It was some weeks before I even was told about the *FX6.0 command to obtain line feed. There is nothing in the Brother or Acorn books on

that.

I have some control over the printer in Basic, but am baffled when using the ROMs. — **A. Nelson, New Milton, Hants.**

● The user guides for the ROMs explain how to send output to the printer. With View the command is simply PRINT.

You'll have to look in the manual to see how to format the text and lay it out.

Bouncing back

HAVING entered and played the game Bounce Ball, from the September issue of Electron User, I noticed that player 1 always receives the ball first.

This seemed somewhat odd as line 1310 contains the variable turn%. I then spotted the following lines:

```
1270 IF turn%=1 THEN
  turn%=2
1280 IF turn%=2 THEN
  turn%=1
```

These are equivalent to:

```
1270 turn%=1
```

I would suggest that these lines should be replaced by:

```
1270 IF turn%=1 THEN
  turn%=2 ELSE turn%=1
```

and the "num%=1" at the end of line 1350 should be replaced by:

```
IF turn%=1 THEN num%=2 ELSE
num%=1
```

These changes cause the player receiving the first ball to depend on the player whose turn it was last. — **D. Brindle, Bolton.**

● Thanks for the modifications — and well spotted.

Electron's OS 1.2?

I OWN an Acorn Electron and a Plus 1 expansion unit. I would like to know if the current operating system is 1.00.

I would also like to know when Acorn are going to upgrade the operating system to 1.2 and if and when they do, would I be able to plug it into

the Plus 1?

My final question is a bit of a tall order.

Could you tell if Acorn are planning to sell a system which plugs into the Plus 1 or the edge connector, which gives the Electron Mode 7 and OS1.2, so that I can run BBC programs? — **K Rose, London.**

● The Electron's operating system is 1.0, which is equivalent to the BBC's 1.2. It is unlikely to be changed.

Acorn aren't planning to produce a Mode 7 adapter. The Electron runs quite a lot of BBC software as it is.

Eyes on the bugs

I AM a new member of the ranks of Electron users.

My knowledge of programming is somewhat scanty, but I find that typing in listings from your magazine, while being a bit of a chore, also provides endless "fun" in debugging not only one's own typing errors but the printer's errors as well.

I accept that this goes with the job. However, may I suggest that you publish in a

fairly prominent position any errors that either readers or contributors find, to help us learners? — **C.H. Earl, Bolton.**

● Any errors that have slipped through are usually spotted immediately by our eagle-eyed readers and a letter follows in Micro Messages.

Bugs are rare, fortunately. If a program doesn't work, 99.9 per cent of the time it is due to a simple typing error when entering the listing.

Plus 1 connection

I AM considering the purchase of a Plus 1 attachment for my Electron as long as it will enable me to link to the Centronics 702 printer I have acquired.

Can you please confirm that this connection is possible and if I need to buy a lead connector between the Plus 1 and printer (36 point input point) and where I can purchase same? **A.T. Cranch, Hoddesdon, Herts.**

● The Plus 1 has a printer port which enables any Centronics compatible printer to be connected. The shop selling the Plus 1 should be able to supply a printer lead.

More claims to fame

After accepting his challenge in the Electron User, I have finally beaten Andrew Clark at Cybertron Mission — but it has taken me 2½ months to do it.

My score was 35,710 on level 3 and I had a pot and key but couldn't find the ring.

Here are some more of my high scores and wonder if anyone could beat me at Acornsoft's Meteors? My top score is 59,800.

My hi-score for Snapper is 41,410 and for Killer Gorilla I have scored 46,100 using a Quick Shot II.

I also agree with the vast number of people who have written in asking for a Hall of Fame just for Electron users and also software charts like Paul Rudd and Jamie Pizey compiled. — **Stephen Leonard, Nuneaton.**

● The problem with high-score tables is one of verification. How can we tell if the score is real or not?

If anyone can come up with a foolproof method for verifying a high score, we would be very interested.

I AM writing to tell other readers about Micro Olympics. I have got some really unbelievable times on the running events:

100 metres	5.29
200 metres	9.96
400 metres	21.31
800 metres	45.51
1500 metres	1:30.58

To do these times, I used the conversion for a First Byte interface you had in a letters page a few issues ago.

Make one leg 3 and the other leg any key you want.

As soon as you go, put the joystick on auto fire and keep your finger firmly on the key you choose and leave it there.

Rhythmic relay

WHILE experimenting with my Electron's sound channels, I came up with this short but interesting routine:

```
10MODE 6
20INPUT "Rhythmic type (1-10)";s
30INPUT "Speed of ticking (1-10)";hs
40INPUT "Tempo (1-10)";t
50REPEAT
  60A=A+s
  70IF A MOD hs=0 THEN PRO
  80A=0
90UNTIL FALSE
100DEF PROCmotor
  110MOTOR 1
  120A=INKEYS(0)
  130MOTOR 0
  140ENDPROC
```

— **Paul James, Ryde, I.O.W.**

● The program produces some excellent sound effects. The interesting part is the way it plays the rhythm using the cassette relay. Prolonged use might not be good for it though.

You should beat the computer easily. — **Steven Bracey, Bristol.**

● That's cheating isn't it? Hardly in the spirit of the Olympics.

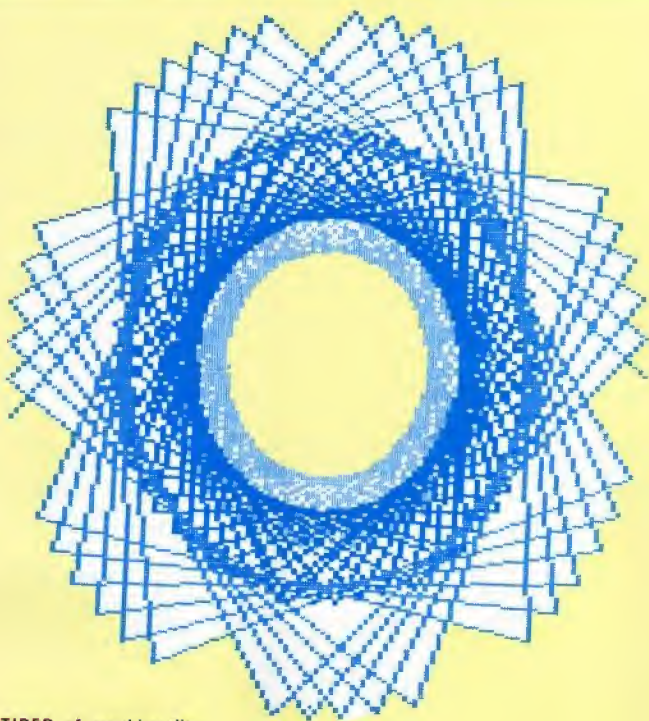
I FEEL I should write to congratulate Superior Software for their latest release, Repton. It is by far the most challenging game devised for the Electron.

The graphics are superb and the four way scrolling is the best I have seen so far produced on the Electron. Well done.

If anyone who has the game but finds the screens too difficult to complete, think of some well-known reptiles.

My high scores are: Repton 2,915, Guardian 100,900, Ghoulis 2,110, Snapper 42,980. — **P.A. Phillips, Stansted, Essex.**

KALEIDOSCOPE



TIRED of graphics displays? Think you've seen it all? Then feast your jaded eyes on PHIL ORD's hypnotically beautiful Kaleidoscope.

And if you feel like an intellectual challenge try working your way through the IFs and ELSEs of line 210.

After entering the main loop at line 110 the procedure for defining and drawing each design is called. At each pass

through the loop a new design is created and displayed.

Lines 160-180 set the graphics origin to the centre of the screen, and set the radius and initial colour of each design.

Lines 190-210 determine the starting point and the angle at which each line is drawn to the last line.

The variables G and D help to select at random which

angle to use.

To make each design symmetrical, an exact number of lines has to be drawn.

This number differs according to the value of variable G and is held in variable Z.

Lines 220-260 draw the design in rapidly changing colours.

The finished picture is a composite of 20 designs superimposed one on another.

```

10 REM KALEIDOSCOPE
20 REM By Phil Ord
30 REM (C) ELECTRON USER
40 MODE 2
50 VDU23,1,0;0;0;0;
60 ON ERROR IF ERR=17 GO
TO 100 ELSE MODE 6;REPORT:P
RINT" at line ";ERL:END
70 COLOUR 3
80 PRINTTAB(1,14)*TURN U
P THE COLOUR*TAB(3,16)*ON Y
OUR TV SET*TAB(8,20)*THEN P
RESS SPACE-BAR*
90 REPEAT UNTIL GET=32
100 CLS
110 FOR I=1 TO 20
120 PROCdesign
130 NEXT I
140 VDU7:TIME=0:REPEAT UN
TIL TIME=1000:VDU7:GOTO 100
150 DEF PROCdesign
160 X=640:Y=512:R=100:RND
(400):C=RND(15)
170 GCOLOR,C:COLOUR C:PRIN
TTAB(2,4);I
180 VDU29,X;Y;
190 MOVE R*COS(0),R*SIN(0
)
200 G=1+RND(6):D=2+PI/3:S
=D+G
210 IF G=2 Z=23 ELSE IF G
=3 Z=37 ELSE IF G=4 Z=34 EL
SE IF G=5 Z=31 ELSE IF G=6
Z=59 ELSE IF G=7 Z=38
220 FOR lines=1 TO Z
230 VDU19,RND(15),RND(15)
,B,0,0
240 A=lines*5
250 DRAW R*COS(A),R*SIN(A
)
260 NEXT lines
270 ENDPROC

```

This listing is included in this month's cassette tape offer. See order form on Page 61.

Raving Roller

LIFE'S never easy, is it? Just when you thought that summer was here and you can relax in your Electron garden along comes MARK TURNER's Raving Roller.

Equipped with a garden roller, your aim is to clear five gardens of mole mounds which are scattered about at random by the malevolent mammals.

It doesn't sound too difficult, but wait till you see the moles. They've laid mines all over the garden and chase you around as you flatten their mounds. Don't let them catch you, they're killers!

As if that wasn't enough, if you're too slow you'll be fired for time wasting, so get rolling!

The listing starts on Page 52.

VARIABLES

BO%	Bonus points.
LV%	Lives.
L	Level.
C	Code of character for roller.
HC	High score.
SC	Score.
T%	Time.
M%	Number of extra mounds.
S	Number of mounds rolled.
A\$	End of game message.
X%	x coordinate of roller.
Y%	y coordinate of roller.
XX%	Old x coordinate.
YY%	Old y coordinate.
A%(5)	x coordinates of all the moles.
B%(5)	y coordinates of all the moles.
H(5)	Character for moles.
O%(5)	Colours of the backgrounds of each garden.
ZZ%(33)	x coordinates of mounds.
CC%(33)	y coordinates of mounds.

PROCEDURES

PROC_define	Defines characters.
PROC_title	Performs title display.
PROC_arrays	Dimensions arrays.
PROC_instructions	Displays instructions.
PROC_variables	Sets up variables.
PROC_colours	Redefines colours.
PROC_setup	Sets up screen.
PROC_mole	Moves mole.
PROC_move	Moves roller.
PROC_done_it	Called if all five gardens cleared.
PROC_bang	Explosion if roller hits mine.
PROC_eat	Mole eats you.

From Page 51

```

10 REM Raving Roller
20 REM By M.Turner
30 REM (c) Electron User
40 REM
50 REM
60 BOX=0;M=0;SC=0;LV=3;
L=1;S=0;C=233;MS=256
70 PROC_define
80 MODE 2:VDU 23,1;0;0;0
:0:
90 PROC_title
100 PROC_arrays
110 MODE 6:VDU 23,1;0;0;0
:0:
120 PROC_instructions
130 MODE 5:VDU 23,1;0;0;0
:0:
140 PROC_variables
150 PROC_colours
160 PROC_setup
170 DX=0
180 REPEAT
190 KEY=INKEY(0)
200 FI=0:PROC_mole
210 IF FI=1 THEN PROC_eat
220 IF DX=1 THEN GOTO 280
230 PROC_move
240 IF DX=1 THEN GOTO 280

250 VDU 4:COLOUR 3:PRINT
TAB(12,1);SC:TX=TX+1:PRINT
TAB(12,0);TX:VDU 5
260 IF TX=300 THEN VDU 4:
FOR I=1 TO 7:PRINT:PRINT:PR
INT " YOUR FIRED":PRIN
T: SOUND 0,-15,1,30:NEXT I:A
$=" TOO SLOW YOUR
TIME RAN OUT ":GOTO 1900
270 M=L+L
280 UNTIL S=25*M OR DX=1
290 IF DX=1 THEN 1900
300 BOX=300-TX:SC=SC+BOX
310 VDU4:FOR I=1 TO 1500:
NEXT I:L=L+1
320 IF L=6 THEN SOUND 5,-
15,3,4:SOUND2,-15,3,4:PRINT
TAB(2,12):" SPEED BONUS=":
BOX:PROC_done_it:GOTO 1900

330 CLS:COLOUR7:PRINT TAB
(2,3):" speed bonus=":BOX:F
OR I=1 TO 200 STEP 9:COLOUR
RND(3):PRINT TAB(5,9):"NE
X LEVEL:"SOUND 2,-15,1,3:N
EXT I

```

```

340 PRINT TAB(6,16):"LEVE
L=":L:FOR I=1 TO 900:NEXT I

350 FOR U=1 TO 1700:NEXT
U
360 CLS:S=0;TX=0;YX=31:TX
=0:VDU5
370 GOTO 160
380 DEF PROC_define
390 VDU 23,244,24,36,60,1
65,165,60,36,24
400 VDU 23,243,170,85,170
,85,170,85,170,85
410 VDU 23,255,255,255,25
5,255,255,255,255
420 VDU 23,242,60,126,90,
90,255,255,255,255
430 VDU 23,241,60,126,90,
90,255,195,195,255
440 VDU 23,233,255,24,24,
60,126,255,255,126
450 VDU 23,234,126,255,25
5,126,60,24,255
460 VDU 23,235,97,241,249
,255,255,249,241,97
470 VDU 23,236,134,143,15
9,255,255,159,143,134
480 VDU 23,237,0,0,24,60,
126,126,255,255
490 ENDPROC
500 DEF PROC_instructions
510 PRINT TAB(6,6):" Do v
ou want instructions?"
520 PRINT TAB(14,7):"Pres
s Y or N"
530 *FX15,1
540 KEY=GET$
550 IF KEY<>"Y"ANDKEY<>
"N"THEN$20
560 IF KEY$="N" THEN ENDP
ROC
570 CLS:PRINT TAB(13,0):"
INSTRUCTIONS":TAB(13,1):"*
*****"
580 PRINT TAB(2,31):"ATM:"
"" You the gardener must r
id your boss's gardens of
mole mounds with your garde
n roller. There are 5 garde
ns/levels to clear of moun
ds."
590 PRINT"" IN PLAY:"""
Each garden has a speed lim
it of 300 on the on screen
timer."
600 PRINT" The gardens are
however guarded by de

```

```

adly moles."
610 PRINT" The moles are
not stupid as they have 1a
id mines all over each gar
den in the hope that you m
ight hit one."
620 PRINT" You have '3' l
ives in which to succeed,Po
ints are gained for each m
ound which is flattened and
for the time taken for eac
h garden which is cleared."
630 *FX15,1
640 PRINT " *****PRESS
SPACE TO CONTINUE*****"

650 KEY$=GET$:CLS
660 PRINT TAB(0,4):" M.O
.V.E.M.E.N.T":PRINTTAB(3):"
*****"
670 PRINT:PRINT" USE KEYS
:"
680 PRINT:PRINT TAB(4):""
'A' = UP:PRINT TAB(4):""Z
' = DOWN:PRINT TAB(4):""<
' = LEFT:PRINT TAB(4):"">
' = RIGHT"
690 PRINT TAB(6,24):"****
*PRESS SPACE TO START*****"

700 IF INKEY(-99) THEN 71
0 ELSE 700
710 ENDPROC
720 DEF PROC_variables
730 YX=0;YX=31:TX=0;YX=
31:I=19:U=30:TX=0:LV=3:C=2
33:CC=233:0=0:L=1:M=0
740 ENDPROC
750 DEF PROC_arrays
760 DIM H(5),ZZ(35),CC(
35),AZ(5),BX(5),OX(5)
770 ENDPROC
780 DEF PROC_setup
790 RESTORE 3210
800 FOR I=1 TO 5:READ OX(
I):NEXT I
810 VDU 19,0,OX(I):0;0;0;
0:
820 VDU4:C=233:COLOUR2:PR
INT TAB(0,2):" SCREEN BEING
SETUP":
830 FOR W=1 TO 5:H(W)=41:
NEXT W
840 FOR W=1 TO L:L=0;Y=79
9
850 AZ(W)=X:BX(W)=Y
860 NEXT W

```

```

870 M=L+L
880 FOR I=1 TO 25*M
890 KK=RND(19):LL=RND(30)
:IF LL<3 THEN LL=3
900 COLOUR3:PRINT TAB(KK,
LL):CHR$(244):
910 NEXT I
920 RESTORE
930 FOR I=1 TO 25*M
940 H=RND(19):K=RND(30)
950 I=1:REPEAT
960 IF K<3 THEN K=3
970 IF H=0 AND K=30 OR H=
0 AND K=25 THEN H=RND(19):K
=RND(30):GOTO 960
980 IF H=ZZ(I) AND K=CC(I
I) THEN H=RND(19):K=RND(30)
:GOTO960
990 I=I+1:UNTIL I=25*M
1000 ZZ(I)=H:CC(I)=K
1010 COLOUR1:PRINT TAB(H,K
):CHR$(237):
1020 READ A:SOUND 2,-15,A,
2
1030 NEXT I
1040 PRINT TAB(0,2):
1050 FOR W=1 TO 20:SOUND 3
,-15,W*10,2:PRINT " :NEXTW
1060 COLOUR 3:PRINT TAB(7,
0):"TIME=":TX
1070 PRINT TAB(6,1):"SCORE
=":SC
1080 MOVE 0,945:GCOLOR,3:DR
AW 1280,945
1090 MOVE 0,948:GCOLOR,2:DR
AW 1280,948
1100 MOVE 0,952:GCOLOR,1:DR
AW 1280,952
1110 FOR W=1 TO LV:PRINT
TAB(0,W,1):CHR$(233):NEXT
W
1120 VDU5:MOVE X,Y:GCOL
0,0:VDU 255:GCOL 0,2:MOVE I
,X,Y:VDU4
1130 ENDPROC
1140 DEF PROC_colours
1150 VDU 19,0,0;0;0;0;0:
1160 VDU 19,2,4;0;0;0;0:
1170 VDU 19,3,0;0;0;0;0:
1180 ENDPROC
1190 DEF PROC_mole
1199 W=0
1200 M=M+1
1210 RA=RND(7):IF RA=1 OR
RA=2 OR RA=7 THEN 1400

```

```

1220 MOVE AZ(W),BZ(W)
1230 IF H(W)=244 THEN GCOL
0,3:GOTO 1260
1240 IF H(W)=237 THEN GCOL
0,1:GOTO 1260
1250 GCOL 0,0
1260 VDU H(W)
1270 GCOL0,3
1280 IF RA=5 OR RA=6 THEN
ON RND(4)GOTO 1300,1330,136
0,1390
1290 IF BZ(W)=YZ THEN 132
0
1300 BZ(W)=BZ(W)+32
1310 IF BZ(W)>927 THEN BZ(
W)=927
1320 IF BZ(W)<=YZ THEN 135
0
1330 BZ(W)=BZ(W)-32
1340 IF BZ(W)<31 THEN BZ(W
)=31
1350 IF AZ(W)=XZ THEN 138
0
1360 AZ(W)=AZ(W)+64
1370 IF AZ(W)>1216 THEN AZ
(W)=1216
1380 IF AZ(W)<=XZ THEN 141
0
1390 AZ(W)=AZ(W)-64
1400 IF AZ(W)<0 THEN AZ(W)
=0
1410 IF BZ(W)>927 THEN BZ(
W)=927 ELSE IF BZ(W)<31 THE
N BZ(W)=31
1420 IF AZ(W)>1216 THEN AZ
(W)=1216 ELSE IF AZ(W)<0 TH
EN BZ(W)=0
1430 MOVE AZ(W),BZ(W)
1440 IF POINT(AZ(W)+16,BZ(
W)-12)=3 THEN H(W)=244:GCOL
0,3:GOTO 1470
1450 IF POINT(AZ(W)+16,BZ(
W)-12)=1 THEN H(W)=237:GCOL
0,1:GOTO 1470
1460 H(W)=241
1470 VDU H(W)
1480 IF AZ(W)=XZ AND BZ(W)
=YZ THEN FX=1
1490 IF W<L THEN 1200
1500 ENDPROC
1510 DEF PROC_eat
1520 FOR I=1 TO 8
1530 SOUND 0,-15,4,2
1540 MOVE XZ,YZ:GCOL0,0:VD
U 255:GCOL0,3
1550 MOVE XZ,YZ:VDU241
1560 k=0:REPEAT:k=k+1:UNTIL

```

```

L k=55
1570 MOVE XZ,YZ:GCOL0,0:VD
U255
1580 MOVE XZ,YZ:GCOL0,3:VD
U242
1590 k=0:REPEAT:k=k+1:UNTIL
L k=55
1600 NEXT I
1610 LVZ=LVZ-1:IF LVZ=0 TH
EN 02=1:ENDPROC
1620 FOR W=1 TO L
1630 MOVE AZ(W),BZ(W):GCOL
0,0:VDU255
1640 MOVE AZ(W),BZ(W)
1650 IF H(W)=237 THEN GCOL
0,1:VDU 237
1660 IF H(W)=244 THEN GCOL
0,3:VDU 244
1670 NEXT W
1680 MOVE XZ,YZ:GCOL0,3:VD
U 255:MOVE XZ,YZ
1690 GCOL 0,0:VDU255:MOVEX
Z,YZ:GCOL0,2
1700 AS=" YOUR DEAD"
1710 FOR H=255 TO 1 STEP -
18:GOTO 1,-15,H,1:NEXT H
1720 FOR W=1 TO 500:NEXT W
1730 IF XZ=0 AND YZ=3! THE
N 1780
1740 FOR W=1 TO L
1750 AZ(W)=0:BZ(W)=31
1760 NEXT W
1770 GOTO 1810
1780 FOR W=1 TO L
1790 AZ(W)=0:BZ(W)=799
1800 NEXT W
1810 VDU4
1820 PRINT TAB(0,1);" "
;
1830 FOR W=1 TO LVZ
1840 PRINT TAB(0+W,1):CHR(
253);
1850 NEXTW
1860 FOR I=1 TO 5:H(I)=241
:NEXTI
1870 VDU5
1880 MOVE XZ,YZ:GCOL 0,0:V
DU 255:MOVE XZ,YZ:GCOL0,2:V
DU0
1890 ENDPROC
1900 REM****THE END****
1910 VDU4
1920 FOR T=1 TO 1000:NEXT
T
1930 FOR U=1 TO 55:PRINT:S
OUND 1,-15,0,2:NEXT U
1940 COLOUR 3

```

```

1950 IF L=6 THEN L=5
1960 PRINT " _L_E_V_E_L="
;"L
1970 FOR I=1 TO 3:PRINT:NE
XTI
1980 PRINT:PRINT " YOUR
SCORE=";SC
1990 IF SC=HS THEN HS=SC:P
RINT:PRINT " A NEW HIGH S
CORE"
2000 PRINT:PRINT " HIGH
SCORE=";HS
2010 FOR I=1 TO 0:PRINT:NE
XT I
2020 PRINT I;" *I#
2030 FOR I=1 TO 0:PRINT:NE
XT I
2040 *FX15,1
2050 PRINT TAB(3,29);"ANOT
HER GO Y/N";
2060 KEY$=GET$
2070 IF KEY$="M" THEN CL6:
VDU7:PRINT TAB(3,6);"****CH
ICKEN****":END
2080 IF KEY$<>"Y" THEN 206
0
2090 CL5:002=0:XX=0:SC=0:Y
Z=31:TX=0:LVZ=3:L=1:S=0
2100 GOTO 160
2110 DEF PROC_title
2120 CLS
2130 FOR I=1 TO 18
2140 COLOUR RND(7):PRINT T
AB(I,0):CHR$(237);
2150 COLOUR RND(7):PRINT T
AB(I,31):CHR$(237);
2160 SOUND 0,-15,6,1:SOUND
0,0,3,1:NEXT I
2170 COLOUR 7
2180 FOR I=1 TO 30
2190 PRINT TAB(0,I):CHR$(2
41);TAB(19,I):CHR$(241);
2200 SOUND 0,-15,5,1:SOUND
0,0,3,1:NEXT I
2210 VDU5
2220 FOR Y=427 TO 500 STEP
6
2230 MOVE 210,Y
2240 GCOL0,RND(7):PRINT;"R
AVING ROLLER";
2250 NEXTY
2260 GCOL0,13:MOVE 210,532
:PRINT;"RAVING ROLLER";
2270 MOVE 520,340:PRINT I;"
BY";
2280 VDU5
2290 FOR Y=260 TO 200 STEP

```



```

-6
2300 MOVE 275,Y
2310 GCOL0,RND(7):PRINT;"M
ark Turner";
2320 NEXT Y
2330 MOVE 275,Y-16:GCOL0,1
2:PRINT;"Mark Turner";

```

```

2340 VDU4
2350 FOR I=1 TO 2
2360 FOR R=1 TO 20
2370 READ A
2380 SOUND 2,-15,A,3
2390 NEXT R
2400 RESTORE
2410 NEXT I
2420 RESTORE
2430 FOR R=1 TO 1000:NEXT
R
2440 ENDPROC
2450 DEF PROC_done_it
2460 VDU4
2470 FOR I=1 TO 600:NEXT I
2480 FOR W=1 TO 5
2490 FOR I=4 TO 8
2500 SOUND 0,-15,RND(8),4
2510 COLOUR RND(3):PRINT T
AB(3,I);"CONGRATULATIONS"
2520 FOR E=1 TO 200:NEXT E
2530 PRINT TAB(3,1);"
"
2540 PRINT
2550 NEXT I
2560 NEXT W
2570 COLOUR 3
2580 PRINT:PRINT TAB(3);"C
ONBRATULATIONS";
2590 RESTORE
2600 FOR W=1 TO 2
2610 FOR I=1 TO 20
2620 READ A
2630 SOUND 2,-15,A-20,3

```


Raving Roller listing

From Page 53

```

2640 NEXT I
2650 RESTORE
2660 NEXT M
2670 FOR P=1 TO 1000:NEXT
P
2680 A$=" YOU DID IT"
2690 ENDPROC
2700 DEF PROC_bang
2710 FOR I=255 TO 1 STEP -
18
2720 SOUND 4,-15,1,1
2730 NEXT I
2740 J=0
2750 MOVE X,Y:VDU 243
2760 SOUND 0,-15,5,3
2770 FOR E=1 TO 30
2780 MOVE X,Y:GCOL 0,0:VDU
255
2790 H=RND(3)
2800 SOUND 0,-15,4+H,3
2810 GCOL,RND(3)

```

```

2820 R=RND(4)
2830 IF R=1 OR R=2 THEN J=
244 ELSE J=243
2840 MOVE X,Y:VDU J
2850 FOR P=1 TO 80:NEXT P
2860 NEXT E
2870 VDU4
2880 FOR E=255 TO 1 STEP -
18
2890 SOUND 1,-15,5,1
2900 NEXT E
2910 FOR W=1 TO 500:NEXT W
18
2920 LVX=LVX-1
2930 IF LVX=0 THEN DX=1:EN
DPROC
2940 PRINT TAB(0,1);"
2950 FOR E=1 TO LVX
2960 PRINT TAB(0+E,1);CHR#
(233);
2970 NEXT E
2980 VDU5
2990 MOVE X,Y:GCOL 0,0:VD

```

```

U255:GCOL 0,2
3000 A$=" YOUR DEAD"
3010 MOVE X,Y
3020 ENDP
3030 DEF PROC_move
3040 XX=X:YY=Y:CC=C:M=
=0
3050 IF INKEY(-66) THEN YX=
YX+32:C=234:M=1
3060 IF INKEY(-98) THEN YX=
YX-32:C=233:M=1
3070 IF INKEY(-103) THEN XZ=
XZ+64:C=235:M=1
3080 IF INKEY(-104) THEN XZ=
XZ-64:C=236:M=1
3090 IF M=1 THEN J120
3100 M=M+0
3110 ENDP
3120 MOVE XX,YY:GCOL 0,0
:VDU CC:GCOL 0,2
3130 IF YX>927 THEN YX=31
ELSE IF YX<31 THEN YX=927
3140 IF XZ<1216 THEN XZ=0
ELSE IF XZ>0 THEN XZ=1216

```

```

3150 MOVE X,Y
3160 IF POINT(X+16,Y-12)
=1 THEN SOUND,-15,4,5:SC=5
C+1:SC=5+1:GCOL 0,0:VDU 255:G
COL 0,2:MOVE X,Y
3170 IF POINT(X+16,Y-12)
=3 THEN PROC_bang:IF DX=1 T
HEN ENDP
ELSE MOVE X,Y
:GCOL 0,0:VDU C:GCOL 0,2:MO
VE X,Y
3180 VDU C
3190 ENDP
3200 DATA 96,96,100,100,96
,100,96,136,128,124,100,100
,96,128,100,136,100,96,140,
128,96,96,100,100,96,100,96
,136,128,124,100,100,96,128
,100,136,100,96,140,128
3210 DATA 6,2,3,2,6

```

This listing is included in this month's cassette tape offer. See order form on Page 61.

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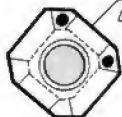
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On the July 1985 tape:
MANIC MOLE Music code action at its best. **HIGHER OR LOWER** Guess the card. **TIME BOMB** Carefully collect. **T.M.C.C.O.** Graphics Two demonstrations. **FX12** The OS on call. **PIRATE** Maths Sum fun. **NOTEBOOK** Password Generator.

On the June 1985 tape:
QUASIMODO Baffling classic. **DISASSEMBLER** Machine code utility. **ACTIVITIES** Educational fun. **REFLECT** Aggressive aliens. **ENGINE** Animation. **DODGE** Race track action. **STRINGALONG** Scrolling fun. **CASTLE** Medieval graphics. **MATHS CURVE** Angles and arcs. **NOTEBOOK** Trees.

On the May 1985 tape:
SINRAMBLE Computerised arcade action. **SHEEPIN** The logic game. **TEXTWRITER** Screen utility. **LIFE** A cultural classic. **CEORIC** Educational fun. **THREE-D** Outstanding utility. **SPORES** Fascinating graphics. **MOONORBIT** Heavily displays. **BLAZON** Heraldic devices. **FLOWERS** A basic bouquet. **NOTEBOOK** Annotated animation.

On the April 1985 tape:
SUPER ARCHER Target practice. **BINARY SEARCH** Search data efficiently. **JOYPLUS** Switches joystick routine. **ODD ONE OUT** Educational fun. **POLYGONS** 3D rotation. **MONEY CRAZY** Arcade.

action. **STARCHART** The night sky. **PORTUNE TELLER** Simple fortune telling action. **COLLISION DETECTION** Alien encounters. **HILLO** Guessing game. **NOTEBOOK** Hello to assembler.

On the March 1985 tape:
MR. FREEZE Ice cube arcade action. **SCREENDUMP** Two procedures for printout dumps. **FILLER** The machine code fill routine. **FRED'S WORD GAME** Educational fun. **BIG LETTERS** Large text utility. **PERCY** Boat the tumbling fuse. **ANIMATION** Two example programs. **PIGS** Flying bacon. **NOTEBOOK** Display formatting.

On the February 1985 tape:
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On the December 1984 tape:
CHRISTMAS BOX Align the presents logically. **SILLY SANTA** Sort out the muddle. **SNAP** Match the Xmas pictures. **RECOVERY** The Bad Program message framed. **CAROL** Interrupt driven music. **AUTODATA** A program that grows and grows. **NOTEBOOK** Simple string handling.

On the November 1984 tape:
STAR FIGHTER Anti-alien missions. **SCROLLER** Wrap around machine code. **URBAN SPRAWL** Environmental action game. **SPELL** Alphabetic education. **JUMPER** Level headed action. **CAESAR** Code breaking broken. **KEYBOARD** Typing game.

On the October 1984 tape:
BREAKFREE Classic arcade action. **ALPHASWAP** A logic game to swap your brain. **SOUND GENERATOR** Tame the Electron's sound channels. **MULTI CHARACTER GENERATOR** Complex characters made simple. **RIGEL'S OUT** Of this world graphics. **MAYDAY** Help with your mouse code. **NOTEBOOK** Palindromes and string handling.

On the September 1984 tape:
HAUNTED HOUSE Arcade action in the spirit world. **SPLASH** A logic game for non-animators. **SHORT SHOWS** How sorting algorithms work. **SORT TIME** The time they take. **CLASSROOM INVADERS** Multicoloured characters go to school. **SAILOR** Nautical antics. **MATHS TEST** Try out your mental powers.

On the August 1984 tape:
SANDCASTLE The Electron seaside

outing. **KNOCKOUT** Bouncing balls battle. **SHOOT** Arcade action. **KEEPER** Keep the joystick dry. **LETTERS** Large letters for your screen. **SUPER-SPELL** Test your spelling. **ON YOUR BIKE** Pedal power control to your Electron. **SCROLLER** Secret binary word adventures. **FLYING PIGS** Bacon on the wing.

On the July 1984 tape:
GOLF A day on the links with your Electron. **SOLITAIRE** The classic solo logic game. **TALK LETTERS** Large characters made simple. **BANK ACCOUNT** Keep track of your money. **CHARTIST** 3D graphs. **FORMULAE** Algebra, volumes and angles.

On the June 1984 tape:
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On the May 1984 tape:
RALLY DRIVER High speed car chase. **SPACE FORCE** Aliens to annihilate. **CODER** Secret messages made simple. **FRUIT MACHINE** Spin the wheels to win. **CHASER** Avoid your opponent to survive. **TIC-TAC-TOE** Electron classic and cross the line. **DRAGHTSMAN** Create and save Electron masterpieces.

On the April 1984 tape:
SPACEHIKE A hopping arcade classic. **FREEZE** Electron wallpaper. **PELICAN** Cross roads safely. **CHESSMASTER** Clock your moves. **ASTEROID** Space is a minefield. **LIMERICK** Automatic rhymes. **ROMAN** Numbers in the ancient way. **BUNNYBLITZ** The Easter program. **DODGUDUCK** The classic logic game.

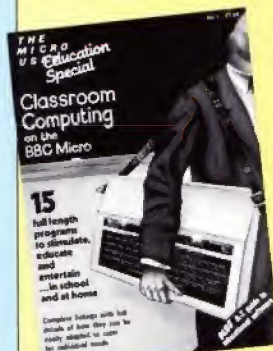
On the March 1984 tape:
CHICKEN Let dangerous drivers test your nerves. **GORF** A tennis-like word game from Down Under. **PARKY'S PERIL** Parky is in an invisible car. **REACTION TIMER** How fast are you? **BRAINTEASER** A puzzling program. **COUNTY** Counting arithmetic can be fun! **PAPER, SCISSORS, STONE** Out guess your Electron. **CHARACTER GENERATOR** Create shapes with this utility.

On the February 1984 tape:
NUMBER BALANCE Test your powers of mental arithmetic. **CALCULATOR** Make your Electron a calculator. **DOLLIES** Multicoloured graphics. **EUROPE** Test your geography. **KALEIDOSCOPE** Electron graphics run riot. **CAPITALS** Have your cards close. **ROCKET, WHEEL, CANDLE** Three fireworks programs. **BOMBER** Drop the bombs before you crash. **DUCK** Simple animation. **METEORS** Collisions in space.

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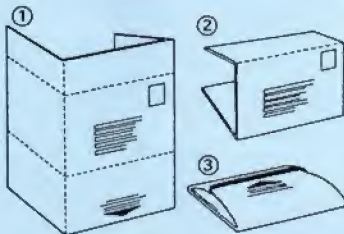
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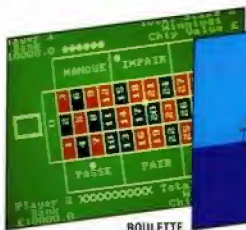
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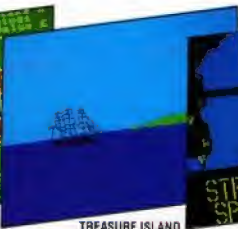
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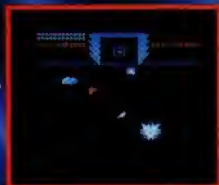
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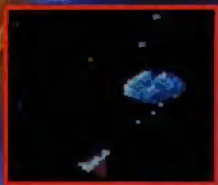
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